Draft Detailed Project Report and Environmental Assessment - Sea Lamprey Barrier Project

Conneaut Creek, Erie County, PA

Section 506 Great Lakes Fishery and Ecosystem Restoration

P2# 495058

May 2024

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US Army Corps of Engineers®
Buffalo District

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SECTION 506 GREAT LAKES FISHERY AND ECOSYSTEM RESTORATION – SEA LAMPREY BARRIER PROJECT

ERIE COUNTY, PENNSYLVANIA

The U.S. Army Corps of Engineers (USACE) Buffalo District has conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended. This Detailed Project Report and Environmental Assessment (DPR/EA) for the Conneaut Creek Great Lakes Fishery and Ecosystem Restoration – Sea Lamprey Barrier Project addresses the feasibility and potential environmental effects associated with the implementation of sea lamprey control alternatives for the proposed study area along Conneaut Creek, Erie County, Pennsylvania. This study was conducted under the authority of Section 506 of the Water Resources Development Act of 1992, as amended.

The DPR/EA evaluated various alternatives that would effectively limit sea lamprey migration into Conneaut Creek thereby reducing or eliminating the need for lampricide treatments. The Recommended Plan (Alternative 4a) is the National Ecosystem Restoration (NER) plan, which includes:

> A seasonally operated adjustable low crest barrier that uses an Obermeyer gate and electrical barrier with trap and sort and jumping pool at Griffey Road to provide more efficient and effective means to prevent or significantly reduce the numbers of sea lamprey from reaching upstream spawning habitat in Conneaut Creek.

In addition to a "no action" plan, four other alternatives were evaluated. These consisted of an electric only barrier, a high fixed crest barrier, a low fixed crest, and a low adjustable crest (Obermeyer). The formulation of alternatives, selection criteria, and the eventual selection of the Recommended Plan are discussed in Sections 3.4, 3.7 and 5 of the DPR/EA, respectively.

A detailed assessment of the potential effects of the project alternatives is presented in Section 4 of the DPR/EA while a summary assessment of the potential effects of the Recommended Plan is listed in the table below:

Public Interest	Insignificant effects	Insignificant effects as a result of mitigation	Resource unaffected by action
Demographics	☐	☐	☒
Associated Land Use and Development	☒	☐	☐
Public Facilities and Services	☐	☐	☒
Water and Sewer Facilities	☐	☐	☒
Recreation	☒	☐	☐
Noise	☒	☐	☐
Aesthetic Values	☒	☐	☐
Public Health and Safety	☒	☐	☐
Transportation	☒	☐	☐
Cultural resources	☐	☐	☒

Environmental justice	☐	☐	☒
Hazardous, Toxic, and Radioactive Waste	☐	☐	☒
Air quality	☒	☐	☐
Water quality	☒	☐	☐
Sediment Quality	☒	☐	☐
Greenhouse Gases and Climate Change	☒	☐	☐
Plankton & Benthos	☒	☐	☐
Vegetation	☒	☐	☐
Fisheries	☒	☐	☐
Wetlands	☒	☐	☐
Streams and Floodplains	☒	☐	☐
Wildlife	☒	☐	☐
Threatened and Endangered Species	☒	☐	☐

All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the Recommended Plan. Best management practices as detailed in the DPR/EA will be implemented, if appropriate, to further minimize impacts.

No compensatory mitigation is required as part of the Recommended Plan.

A scoping document was distributed to the public, local, state, federal agencies and applicable Indian tribes on July 22, 2022. Comments were received from the U.S. Environmental Protection Agency on August 22, 2022, and from three interested parties/adjacent property owners. Those comments were evaluated and addressed in the appropriate sections of this EA. A copy of the scoping document and all comments received are in Appendix A-6.

Pursuant to Section 7 of the Endangered Species Act of 1973, as amended, the USACE determined that the Recommended Plan will have no effect on federally listed species or their designated critical habitat. The project is within the range of several species that are listed as threatened or endangered. However, the project will have no effect on these species. The project may affect, but will not adversely affect, the Indiana bat and northern long-eared bat due to restrictions on seasonal vegetation clearing restrictions (Sections 4.3.10 and 7.1.6). The tricolored bat is not currently listed but likely will be before the project goes to construction. Based on the information provided on the USFWS website, this species may use a wide range of habitat but is anticipated that similar tree cutting dates to Indiana bat and northern long eared bat will apply. The salamander mussel is also not currently listed but likely will before the project goes to construction. The USFWS is also proposing critical habitat for this species and the proposed project location at Griffey Road is within the 62 river miles of Conneaut Creek currently proposed as critical habitat. Detailed surveys conducted by Pennsylvania Department of Environmental Protection (PADEP) and Pennsylvania Department of Conservation and Natural Resources (PADCNR) have not identified salamander mussels within the reach of stream near Griffey Road. This proposed project would reduce or eliminate the application of lampricide over approximately 50 miles of stream upstream of Griffey Road, with much of that being within this proposed critical habitat for salamander mussels. Thus, despite this project potentially impacting some of the proposed critical habitat during construction and seasonal inundation, the project would protect a much larger portion of this critical habitat from lampricide application. Coordination and informal consultation with USFWS and state and local agencies is ongoing (Appendix A-6).

Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, the USACE determined that the Recommended Plan will have no effect on historic properties. The Pennsylvania State Historic Preservation Office (SHPO) concurred with this finding on March 29, 2024 (Appendix A-6).

Pursuant to the Clean Water Act of 1972, as amended, the discharge of dredged or fill material associated with the Recommended Plan has preliminarily been found to be compliant with the Section 404(b)(1) Guidelines (40 CFR 230). A Clean Water Act Section 404(b)(1) Evaluation has been drafted and is found in Appendix A-6 of the DPR/EA. This evaluation will be finalized prior to the project's pre-construction engineering and design phase following issuance of a Clean Water Act Section 404(a) public notice and consideration of all applicable comments related to this proposed discharge.

Also pursuant to Section 401 of the Clean Water Act, USACE will obtain a water quality certification from PADEP prior to construction.

All applicable environmental laws have been considered and coordination with appropriate agencies and officials has either been completed or initiated. A list of these laws is provided in Section 7, *Compliance with Environmental Protection Statutes and Executive Orders.*

Technical, environmental, and cost effectiveness criteria used in the formulation of alternative plans were those specified in the Water Resources Council's 2013 *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*. Analysis has shown that the proposed project is not a major federal action that would result in significant adverse impacts on the quality of the human or natural environment. Public coordination, to date, has not encountered any significant environmental controversy. All applicable laws, executive orders, regulations, and local government plans were considered in the evaluation of alternatives. Based on this report, the reviews by other federal, state and local agencies, tribes, input of the public, and the review by my staff, it is my determination that the Recommended Plan would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required. Full compliance will be attained once the public review period is concluded and no significant adverse impacts are identified and the FONSI is signed.

Date: _____

_____
Lyle R. Milliman
Lieutenant Colonel, U.S. Army
District Commander

DETAILED PROJECT REPORT
AND
ENIRONMENTAL ASSESSMENT
FINDING OF NO SIGNIFICANT IMPACT

SECTION 506, WATER RESOURCES DEVELOPMENT ACT OF 1992, as amended
GREAT LAKES FISHERY AND ECOSYSTEM RESTORATION - SEA LAMPREY BARRIER PROJECT (#495058)

CONNEAUT CREEK
ERIE COUNTY, PENNSYLVANIA

Executive Summary

This Detailed Project Report/Environmental Assessment (DPR/EA) presents the findings of the Conneaut Creek Section 506 Great Lakes Fishery and Ecosystem Restoration – Sea Lamprey Barrier Project. It documents the plan formulation process and potential environmental effects associated with the implementation of sea lamprey control alternatives for the proposed study area. The study area includes the mainstem of Conneaut Creek in Pennsylvania between the Ohio-Pennsylvania border at river mile (RM) 24.5 and the confluence of the East Branch of Conneaut Creek at RM 38.5. The proposed sea lamprey barrier project is in Conneaut Creek near Griffey Road in Erie County, Pennsylvania.

The sea lamprey (*Petromyzon marinus*) is a primitive, eel-like fish that originally entered the Great Lakes from the Atlantic Ocean. Mature adults migrate into streams to spawn from early March through July in various parts of the Great Lakes basin, and the larvae that develop from the eggs take up residence in stream bottoms feeding on organic debris and algae in the stream until they transform to their parasitic form and return to the lakes 3 to 10 years later. Upon returning to the lakes, they attach to large fish such as salmon and lake trout using their suction-cup like mouths to feed on them as parasites. During their parasitic phase, which lasts 12 to 18 months, it is estimated that each lamprey kills approximately 40 pounds of fish. The mortality caused by the sea lamprey, combined with intense fishing pressure and spawning habitat destruction, has resulted in the decline of many native fish species in the Great Lakes.

Since 1954, the Great Lakes Fishery Commission (GLFC) has been implementing a comprehensive sea lamprey control program to reduce impacts of the invasive sea lamprey population on native fish stocks in the Great Lakes. Current sea lamprey control methods depend heavily on the use of chemical lampricides, and lampricide is applied in Conneaut Creek every two to five years to eliminate or reduce larval sea lamprey populations. Significant cost as well as public and ecological concern are associated with continued and repeated use of lampricide. As such, the GLFC has committed to reduce lampricide application through the implementation of alternative lamprey control strategies, including the use of barriers to block sea lamprey migration into spawning areas.

This study evaluates the feasibility of implementing a permanent sea lamprey control alternative in Conneaut Creek, Pennsylvania. The objectives of this study are to provide the sponsor, the GLFC, with a more efficient and effective means to prevent or significantly reduce the numbers of sea lamprey from reaching approximately 50 river miles of spawning habitat in Conneaut Creek, reduce the need to use lampricide in Conneaut Creek, and to maintain or improve the stream habitat quality for desirable fish species. Over the course of this study, seven alternatives were formulated and screened down to a focused array of five alternatives. The focused array of alternatives included the no-action alternative as well as four types of barriers with accompanying fish passage and recreational mitigation structures that include a high fixed crest barrier, an electric barrier, a low fixed crest and electric barrier, and a low adjustable crest and electric barrier.

The Recommended Plan and National Ecosystem Restoration (NER) Plan, Alternative 4a, consists of a seasonally operated adjustable low crest barrier that uses an Obermeyer gate (steel panels raised by an inflatable air bladder) and electrical barrier with trap and sort and jumping pool to accommodate fish passage at Griffey Road. A portage is included to provide a land route around the barrier for paddlesports. Alternative 4a provides a more efficient and effective means to prevent or significantly reduce the numbers of sea lamprey reaching spawning habitat in Conneaut Creek while minimizing environmental impacts and inundation on adjacent properties. Pending additional engineering evaluations conducted in the design phase and Pennsylvania Department of Transportation approval, the barrier

would tie into the existing Griffey Road bridge abutment and embankment on the right bank. The existing bridge abutment and embankment, along with the low crest barrier, will serve to impound water to achieve a difference in upstream and downstream water levels.

The adjustable crest barrier will be approximately five feet in height above the current creek bed and approximately 110 feet wide, excluding the abutments at each bank. During the design phase, the design team will consider the best location for the electric barrier, measures to prevent fish mortality under the adjustable crest barrier, and bracing details for the adjustable crest to ensure the barrier functions as intended. To accommodate fish passage, the Recommended Plan includes a trap and sort system to trap fish and remove lamprey and a jumping pool. Additional measures including a slotted fishway will be considered during the design phase. To accommodate recreational use of Conneaut Creek and ensure public safety, the Recommended Plan includes a portage that will allow paddlesport boaters to pull out of the water upstream of the barrier, safely cross Griffey Road, and return to the creek downstream of the barrier. Overall, Alternative 4a provides an estimated 160 average annual habitat units (AAHUs) by limiting sea lamprey migration into Conneaut Creek and reducing the need for lampricide applications upstream of the barrier.

Based on fiscal year 2024 price levels, the estimated project first cost is $9,010,000. Escalated to the mid-point of construction, the fully funded project cost to design and implement the Recommended Plan is $9,714,000. In accordance with the cost share provisions of Section 506 authority, the federal share to design and implement the recommended plan is 65 percent and the non-federal share is 35 percent. Additionally, Engineering Pamphlet 1165-2-502 requires that recreational features are cost shared 50 percent federal and 50 percent non-federal. The federal cost share is estimated at $6,931,000 and is within the Section 506 authority limit of $10,000,000. The non-federal share is estimated at $3,684,000. The GLFC is the non-federal sponsor for this project, and they submitted a letter of intent to participate in this capacity on 8 August 2023.

Recommended Plan Cost and Output Summary	
Project First Cost*	$9,010,000
LERRDs**	$251,000
Fully Funded Project Cost	$9,714,000
Cost Share***	
Federal Cost Share	$6,931,000
Non-Federal Cost Share	$3,684,000
Aquatic Ecosystem Restoration Metric****	160 Average Annual Habitat Units

* Project First Cost does not include feasibility study costs-to-date.

** Land, Easements, Rights-Of-Way, Relocation, and Disposal Areas (LERRDs) includes escalation out to the mid-point of construction

*** Cost Share is based on the fully funded project cost, including the feasibility study cost.

**** The calculation of average annual habitat units reflects a 50-year period of analysis (2027 - 2076).

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List of Abbreviations and Acronyms

AAHU Average Annual Habitat Unit
AAC Average Annual Cost
ACE Annual Chance Exceedance
AOC Area of Concern
APE Area of Potential Effect
BA Biological Assessment
BE Barrier Effectiveness
BMP Best Management Practices
BO Biological Opinion
B&GEPA Bald and Golden Eagle Protection Act
CAA Clean Air Act
CAR Fish and Wildlife Coordination Act Report
CE/ICA Cost Effectiveness/Incremental Cost Analysis
CERCLA Comprehensive Environmental Response Compensation and Liability Act
CEQ Council for Environmental Quality
CHAT USACE Climate Hydrology Assessment Tool
CWA Clean Water Act
DPR/EA Detailed Project Report/Environmental Assessment
EC Engineer Circular or Environmental Covenants
ECB Engineering and Construction Bulletin
EO Executive Order
EOP Environmental Operating Principles
ER Engineer Regulation
ESA Endangered Species Act or Environmental Site Assessment
EPA Environmental Protection Agency
EQ Environmental Quality
FEMA Federal Emergency Management Agency
FONSI Finding of No Significant Impact
FTE Full-time Equivalence
FWS U.S. Fish and Wildlife Service
FWCA Fish and Wildlife Coordination Act
FY Fiscal Year
GHG Green House Gases
GLFC Great Lakes Fishery Commission
GLFER Great Lakes Fishery and Ecosystem Restoration
HEC-RAS Hydraulic Engineering Center's River Analysis System
HU Habitat Unit
HTRW Hazardous Toxic Radioactive Waste
H&H Hydrology and Hydraulics
IGLD International Great Lakes Datum
IWR Institute for Water Resources
LERRD Lands, Easements, Relocations and Rights of Ways
LiDAR Light Detection and Ranging
LWD Low Water Datum
MBTA Migratory Bird Treaty Act
MCACES Micro-Computer Aided Cost Estimating System
NAAQS National Ambient Air Quality Standards
NED National Economic Development
NEPA National Environmental Policy Act
NER National Ecosystem Restoration
NHPA National Historic Preservation Act
NLCD National Land Cover Dataset
NRCC Northwest Regional Climate Center
NRHP National Register of Historic Places

NSD	Nonstationary Detection Tool
ODNR	Ohio Department of Natural Resources
OEPA	Ohio Environmental Protection Agency
O&M	Operations and Maintenance
OMRR&R	Operations, Maintenance, Repair, Rehabilitation and Replacement
ORAM	Ohio Rapid Assessment Methodology
OSE	Other Social Effects
PA	Preliminary Assessment
PADEP	Pennsylvania Department of Environmental Protection
PADOT	Pennsylvania Department of Transportation
PAFBC/PFBC	Pennsylvania Fish and Boat Commission
PDT	Project Delivery Team
PPA	Project Partnership Agreement
PNHP	Pennsylvania National Heritage Program
P&G	Planning and Guidance
QHEI	Qualitative Habitat Evaluation Index
RBP	Rapid Bioassessment Protocol
REC	Recognized Environmental Condition
RED	Regional Economic Development
REP	Real Estate Plan
RCRA	Resource Conservation and Recovery Act
RM	River Mile
ROE	Rights of Entry
ROM	Rough Order of Magnitude
S&A	Supervision and Administration
SHPO	State Historic Preservation Office
SSR	Sensitive Species Risk
SQ	Stream Quality
T&E	Threatened & Endangered Species
TFM	Lampricide 3-trifluoromethyl-4-nitrophenol
THPO	Tribal Historic Preservation Office
TMDL	Total Maximum Daily Load
USACE	U.S. Army Corps of Engineers
USC	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
WQ	Wetland Quality
WRDA	Water Resources Development Act
WRRDA	Water Resources Reform and Development Act

UNITS

Acres	ac
Cubic Yards	CY
Feet	ft
Million Gallons per day	MGD
LWD	569.2 ft (IGLD; 1985)
Square Miles	mi^2 and sq mi
River Mile	RM
Cubic Feet per second	cfs

Section 1 Introduction

1.1 Introduction

The U.S. Army Corps of Engineers (USACE), Buffalo District is investigating the feasibility of implementing a permanent sea lamprey control alternative in Conneaut Creek, Pennsylvania. The non-federal sponsor for this feasibility study is the Great Lakes Fishery Commission (GLFC). The Commonwealth of Pennsylvania and the U.S. Fish and Wildlife Service (USFWS), acting as the U.S. sea lamprey control agent for the GLFC, have also indicated their support for such a study to help identify opportunities to reduce lampricide treatments and non-target exposures in Conneaut Creek while continuing to control sea lamprey populations. This study documents the plan formulation process, including the selection of a recommended alternative, in accordance with feasibility study guidelines contained in the Planning Guidance Notebook (ER-1105-2-100), Engineering Pamphlet (EP) 1105-2-61, and other pertinent USACE regulations and guidance. The level of detail is appropriate to the scope and complexity of the recommended solution and is sufficient to proceed directly into the preparation of contract plans and specifications.

In accordance with Engineer Regulation (ER) 200-2-2 (Procedures for Implementing NEPA), USACE has assessed the potential environmental effects of the project alternatives on the quality of the human environment. Using a systematic and interdisciplinary approach, an assessment has been made of the potential environmental impacts for each plan as judged by comparing them to the with- and without-project conditions.

1.2 USACE Planning Process

The planning process consists of a series of steps that provide an orderly and systematic approach to providing technical assistance in developing an array of alternatives for the selection of a plan. Plan formulation and evaluation is a dynamic process, whereby the steps may be iterated one or more times as new information or new alternatives are developed or as planning objectives are reevaluated. Each step of the planning process provides information needed for the steps that follow. The Planning and Guidance (P&G) planning process consists of the following major steps and was used as a guide to enable the selection of a recommended plan:

1. Identify Problems and Opportunities;
2. Inventory and Forecast Without Project Conditions;
3. Formulate Alternative Plans;
4. Evaluate Effects of Alternative Plans;
5. Compare Alternative Plans; and
6. Select Plan.

1.3 Study Authority

Section 506 of the Water Resources Development Act (WRDA) of 2000, as amended (42 USC 1962-d22) authorizes the USACE to develop a plan for activities that support the management of Great Lakes fisheries in cooperation with the signatories to the Joint Strategic Plan for Management of the Great Lakes Fisheries and other affected interests. This plan is referred to as the “Support Plan” and it provides guidance for the planning, design, construction, and evaluation of projects to restore the fishery, ecosystem, and beneficial uses of the Great Lakes in cooperation with other federal, state, and local agencies and the Great Lakes Fishery Commission.

Costs for the planning, design, construction, and evaluation of restoration projects are cost-shared 65 percent federal and 35 percent non-federal. Federal participation in any recreation features is limited to 10% of the federal restoration project costs. Non-federal interests may contribute up to 100 percent of their share for projects in the form of lands, easements, right of ways, relocations and soil borrow and disposal areas, plus other materials, supplies, or work in-kind contributions. Non-federal interests are responsible for providing lands, easements, rights–of –way, relocations, and any dredged material disposal areas needed for project construction. Furthermore, non-federal interests must be responsible for the operation, maintenance, repair, rehabilitation, and replacement of projects.

1.4 Study Area (Planning Area)

Conneaut Creek originates in northwestern Pennsylvania and flows north for approximately 35 miles where it then turns west for 26 miles. After crossing the Ohio – Pennsylvania border, the creek turns east-northeast flowing for 13 miles before it drains into Lake Erie. The entire drainage basin for Conneaut Creek is 190.7 square miles (mi^2). Figure 1 illustrates the extent of the Conneaut Creek watershed in Ohio and Pennsylvania. The study area for this project is the mainstem of Conneaut Creek in Pennsylvania between the Ohio-Pennsylvania border at river mile (RM) 24.5 and the confluence of the East Branch of Conneaut Creek at RM 38.5. Prior to commencing this study coordination between the state of Ohio and commonwealth of Pennsylvania determined that a barrier within the state of Ohio was not acceptable due to Wild and Scenic River designation within the state of Ohio, thus the planning area does not include the Ohio portion of Conneaut Creek. This part of northwestern Pennsylvania is located within Congressional District PA-16, represented by U.S. Representative Michael Kelly, and U.S. Senators Robert Casey and John Fetterman.

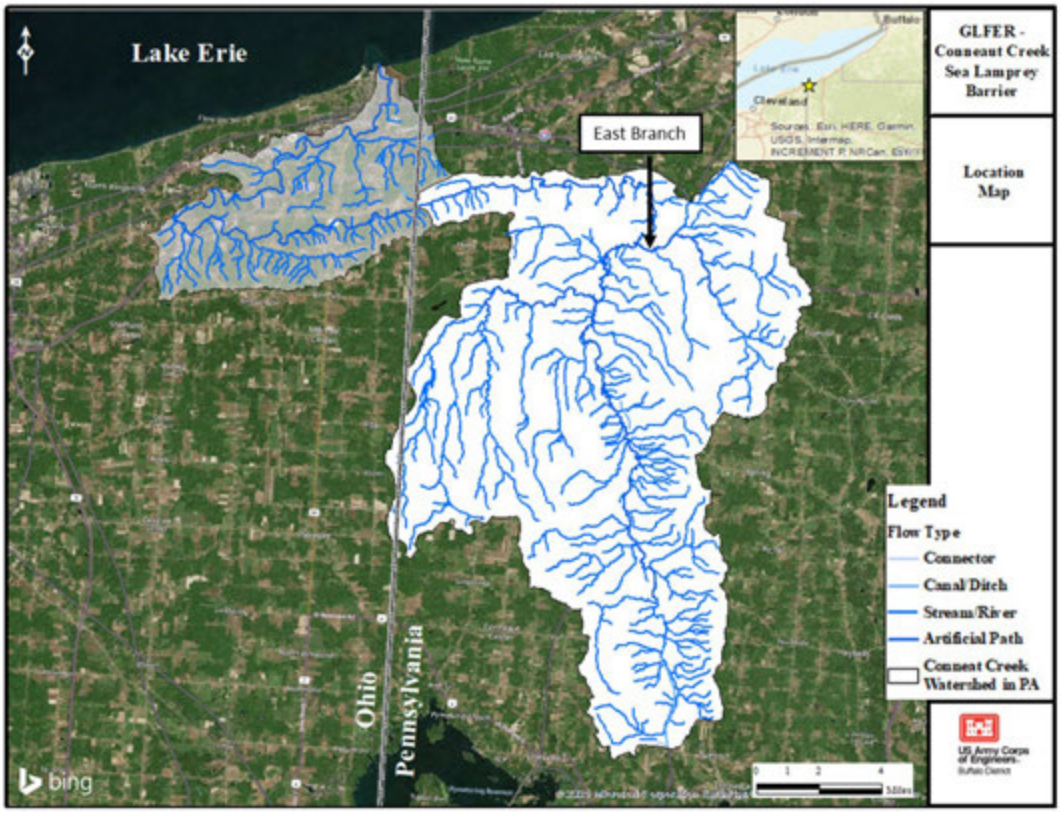


Figure 1: Conneaut Creek watershed located in northeastern Pennsylvania and northwestern Ohio.

1.5 Background and History

The sea lamprey (*Petromyzon marinus*) is a primitive, eel-like fish that entered the Great Lakes from the Atlantic Ocean (Figure 2). Mature adults migrate into streams to spawn from early March through July in various parts of the Great Lakes basin, as indicated in the sea lamprey life cycle in Figure 3. Adults die after spawning and the larvae (ammocoetes) that develop from the eggs take up residence in stream bottoms feeding on organic debris and algae present in the stream until they transform to their parasitic form and return to the lakes 3 to 10 years later. Upon returning to the lakes, they attach to large fish such as salmon and lake trout using their suction-cup like mouths to feed on them as parasites. During their parasitic phase, which lasts 12 to 18 months, it is estimated that each lamprey kills approximately 40 pounds of fish. Secondarily, there is a disfigurement factor associated with sea lamprey wounds that adversely impacts the recreational enjoyment an angler gets when they land a damaged fish. The mortality caused by the sea lamprey, combined with intense fishing pressure and spawning habitat destruction, has resulted in the decline of many native fish species in the Great Lakes.

Figure 2: Sea lamprey in a tank. Photo by Joanna Gilkeson / USFWS (Source: https://www.fws.gov/midwest/SeaLamprey/).

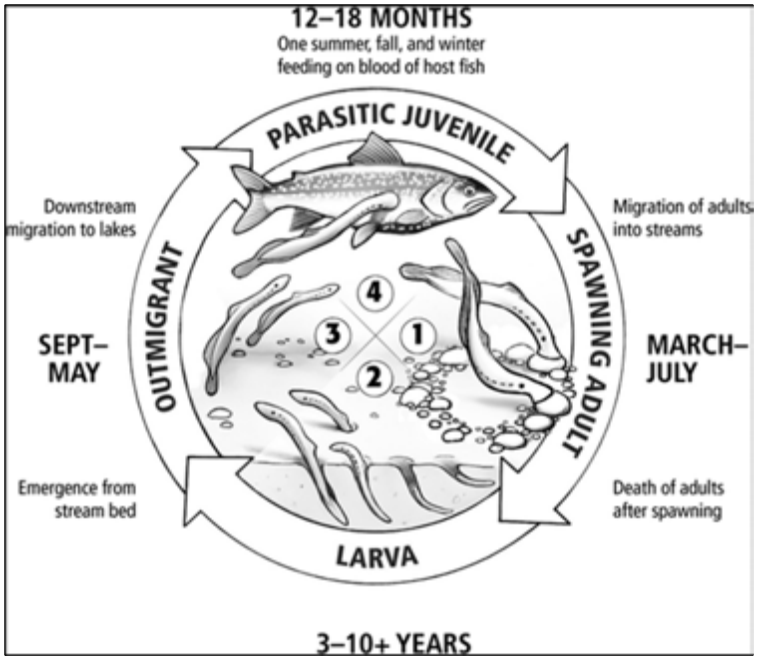


Figure 3: Sea lamprey life cycle (Hansen et al. 2016).

As a result of the dramatic declines in fish stocks, the 1954 bi-national Convention on Great Lakes Fisheries formed the Great Lakes Fishery Commission (GLFC). The Convention charged the GLFC with formulating and implementing a comprehensive sea lamprey control program. A major advance in sea lamprey control occurred with the development and use of lampricides in the late 1950s. Lamprey populations have declined an estimated 90 percent since 1961, largely through the use of lampricides. However, sea lamprey still remain a problem. In addition, there is concern about the heavy dependence on chemical treatment. While lampricides (3-trifluoromethyl-4-nitrophenol TFM and Bayluscide) are characterized as a selective pesticide, lampricide treatments can cause mortality to some federally protected species and state recognized species species (i.e., Northern brook lamprey, native mussels, and mudpuppy) (Grunder et al, 2021, Wilkie et al. 2019) and there is public apprehension about using pesticides. Additionally, early studies suggest that sea lamprey have the potential to evolve resistance to lampricide further underscores the need for alternative controls (Christie et al., 2019). Lastly, lampricide costs have rapidly escalated and the use of integrated methods (i.e., other control methods other than pesticide) for pest management is widely accepted as being the preferred approach.

The Strategic Vision of the Great Lakes Fishery Commission contains three "pillars" for success under its vision statement. Pillar 2 targets "Integrated Sea Lamprey Control," which states that "the Commission will suppress sea lamprey populations to levels that permit achievement of fish community objectives for each Great Lake." Each pillar contains a set of goals and strategies. Goal 1 under Pillar 2 is "Suppress sea lamprey populations to target levels." Development of a Sea Lamprey Barrier and Trap on Conneaut Creek supports Strategies 5 and 6 under Pillar 2, reproduced below.

Strategy 5: Construct and maintain a network of barriers to limit sea lamprey access to spawning habitats. Outcome: Sea lampreys will have reduced access to spawning habitats.

Strategy 6: Deploy trapping methods to increase capture of spawning-phase and recently metamorphosed sea lampreys. Outcome: Effective and efficient trapping techniques will be developed and implemented.

Thirty Lake Erie tributaries have records of larval sea lamprey production (11 Canada, 19 U.S.). The U.S. Fish and Wildlife Service (USFWS), acting as the U.S. sea lamprey control agent for the GLFC, has identified streams in the U.S. where the construction of permanent barriers and trap systems are expected to be a successful, cost-effective control measure and may have fewer negative impacts than application of lampricides. In this case, the project partners feel the impacts of a barrier would be less than those related to continued TFM applications.

Conneaut Creek is one of seven tributaries to Lake Erie that are treated with lampricides every 2-5 years to eliminate or reduce larval sea lamprey populations before they recruit to the lake as feeding juveniles. Lampricides may negatively impact other non-target native fish and invertebrate species. The use of other control technologies, including barriers, are being investigated to control sea lamprey populations more effectively with less overall costs and environmental impact than lampricide. The GLFC has a strong commitment to reduce TFM application through the implementation of alternative lamprey control strategies, including the use of barriers to block sea lamprey migration to spawning areas.

1.6 Purpose and Need

The study evaluates the feasibility of implementing a permanent sea lamprey control alternative in Conneaut Creek, Pennsylvania. This is needed to suppress sea lamprey populations to below target levels as defined in the Lake Erie fish community objectives for the Great Lakes basin (Francis et al., 2020) while also minimizing non-target effects of the current lampricide treatments.

1.7 Problems and Opportunities

The sea lamprey control problems in the study area are characterized by the following:

- Sea lamprey are an invasive species to the Great Lakes that utilize streams for spawning and larval nursery habitat;
- Mortality caused by sea lamprey contributes to a decline in many native and sport fish species; and
- Conneaut Creek is treated with lampricide every two to five years with possible negative impacts upon native fauna.
    - Specifically, the lampricide treatment conducted in 2018 documented adverse impacts.

The following opportunities were identified during the feasibility study:

- Study and implement measures to reduce the reproduction of sea lamprey to minimize their adverse effects on the Great Lakes fish stocks;
- Potential sites are available in Conneaut Creek in the Commonwealth of Pennsylvania to implement a sea lamprey barrier;
- Reduce the use of lampricides in Conneaut Creek to avoid undesirable impacts and protect native species;
- Improve the cost effectiveness of controlling sea lamprey reproduction in Conneaut Creek to make funds available for control efforts elsewhere; and
- Enhancements for anglers and boaters may be incorporated if the Commonwealth of Pennsylvania agrees and regulations allow. Note, recreational features to Section 506 projects are limited to no more than 10 percent of the federal ecological restoration costs per 42 U.S.C. §1962d-22(c)(5).

1.8 Objectives and Constraints

1.8.1 Planning Objectives

The goal for the entire sea lamprey program is to control the invasive sea lamprey in the Great Lakes by reducing sea lamprey production, while allowing native fish access to prime riverine spawning areas. Sea lamprey control is paramount in restoring and maintaining the ecosystem and the robust fishery of the Great Lakes by protecting native and desirable fish from sea lamprey predation. Objectives for this study were developed collaboratively with GLFC, Commonwealth of Pennsylvania, USFWS and other agency stakeholders. The alternatives identified for analysis will need to meet the objectives set forth for the project over the 50-year period of analysis. The planning objectives for this study include the following:

1. Prevent or significantly reduce the numbers of sea lamprey from reaching approximately 50 miles of spawning habitat in Conneaut Creek;
2. Improve the efficiency and effectiveness of sea lamprey management on Conneaut Creek, while reducing the need to use lampricide, thereby reducing negative impacts to native species of Conneaut Creek; and
3. Maintain or improve the stream habitat quality for desirable fish species.

1.8.2 Planning Constraints

Unlike planning objectives that represent desired positive changes, planning constraints represent restrictions that limit the planning process and should not be violated. Planning constraints are limitations or requirements that affect proposed alternatives. This study will consider resource, legal, and policy constraints. Resource constraints are those associated with limits on knowledge, expertise, experience, ability, data, information, money, and time. Legal and policy constraints are those defined by law, USACE policy, and guidance. The following constraints were identified over the course of the study process:

- Passage of native and recreationally important species is very important. Passage of native species should be considered to limit impacts to native fish and mussel populations in Conneaut Creek. Steelhead trout passage is important and may be the simplest to accommodate since sea lamprey passage and steelhead passage seasons generally do not overlap.
- Any structure placed in the stream must account for public safety. Regardless of structure type, recreational use of Conneaut Creek must be kept in mind (e.g., angling, canoe/kayak). If a low head dam and/or electrical components are considered, it should be a design that prevents dangerous hydraulic conditions and safety hazards to the public.
- The location and design of a physical barrier must minimize the need for real estate acquisitions and easements.
- The Great Lakes Fishery and Ecosystem Restoration (GLFER) authority limits federal project expenditure for any project conducted under this authority to $10,000,000.
- Any selected alternative must meet applicable environmental compliance requirements, including minimization or avoidance of any adverse impacts to natural resources with the project's area of influence (e.g., wetlands).

1.9 Study Scope

The study scope focuses on developing an engineering solution involving a permanent sea lamprey barrier on Conneaut Creek between river mile 24.5 and 38.5. During this study, USACE and the project partners collected additional data to support the development and evaluation of multiple alternatives and the ultimate selection of the most suitable alternative.

Section 2 Existing and Future Without Project Conditions

2.1 Period of Analysis

For this study, the period of analysis is 50 years (2027-2076), the typical planning horizon for feasibility studies. There are no special circumstances that warrant changing the period of analysis from the planning horizon.

2.2 General Setting

The Conneaut Creek Watershed is located in the extreme northeast corner of Ashtabula County, Ohio and northwestern Pennsylvania. Of the 190.7 square mile watershed, 153.5 sq mi, including most of the headwater streams, are in Pennsylvania. The Conneaut Creek mainstem originates south of Conneautville in Crawford County, Pennsylvania. In general, Conneaut Creek flows in a northwesterly direction towards Kingsville, Ohio. The river then turns and flows northeast to the City of Conneaut, where it enters Lake Erie. The mainstem of the river is approximately 68 miles in length with 24.5 of those miles in Ohio. The focus of this study is the mainstem of Conneaut Creek in Pennsylvania between the Ohio-Pennsylvania border at river mile 24.5 and the confluence of the East Branch of Conneaut Creek at RM 38.5 (Figure 4).

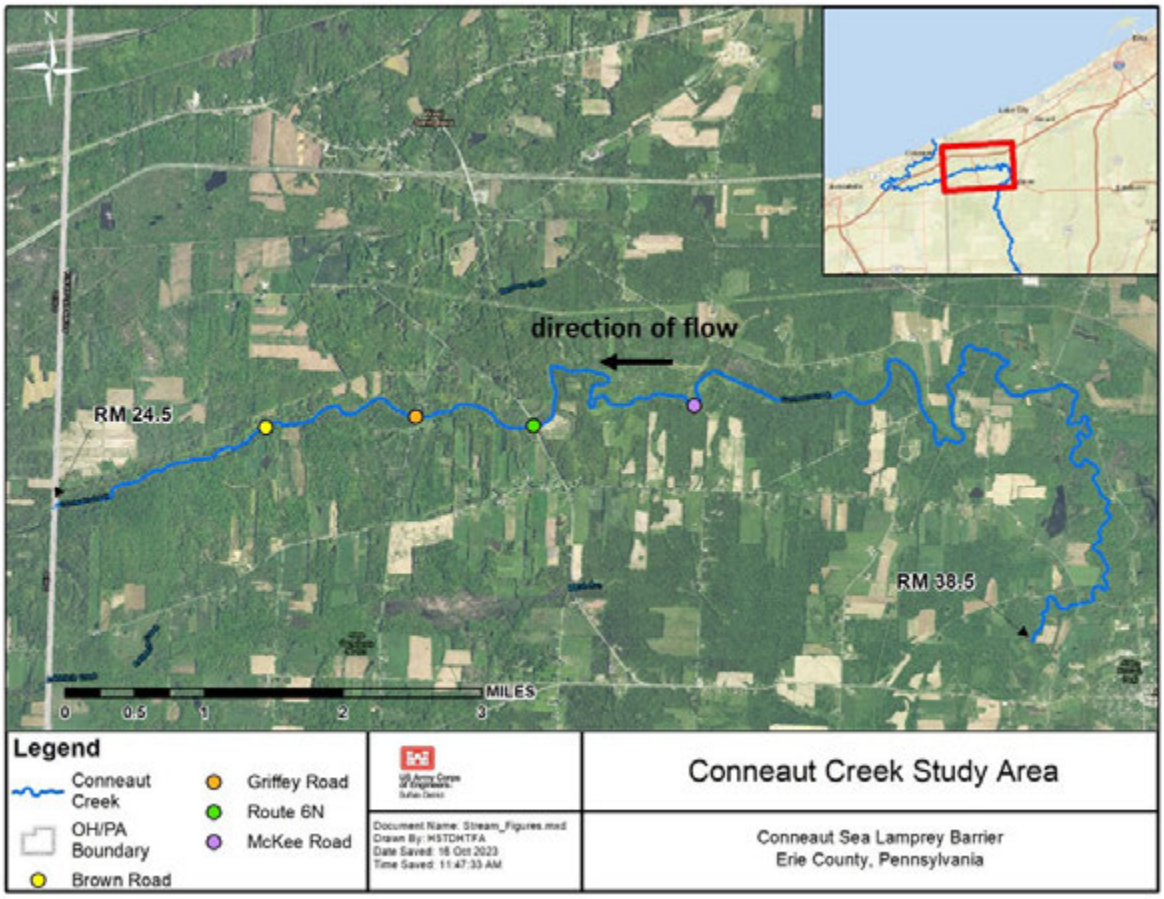


Figure 4: Focused study area, encompassing the mainstem of Conneaut Creek in Pennsylvania between the Ohio-Pennsylvania border at river mile 24.5 and the confluence of the East Branch of Conneaut Creek at RM 38.5.

Conneaut Creek and its associated tributaries within Pennsylvania provide high quality stream habitat, making it one of the most biologically diverse tributaries to Lake Erie. Because Conneaut Creek has not experienced the adverse impacts of industrial contamination and land development like many other Lake Erie watersheds, Conneaut Creek still has an extensive forested corridor and overall good water quality. The creek supports a high diversity of native fish, freshwater mussel, amphibian, reptile, and bird species. The creek also supports extensive floodplain wetland complexes. Conneaut Creek is a popular destination for anglers for its seasonal populations of steelhead, smallmouth bass, walleye, and northern pike. Conneaut Creek provides an important fishery of local and statewide significance.

2.3 Physical / Natural Environment

2.3.1 Geology

The Conneaut Creek Watershed is situated within the gently rolling, dissected glacial plateau of the Erie-Ontario Lake Plain ecoregion and the Appalachian Plateau lowlands physiographic province. During the Pleistocene era, varying thicknesses of glacial drift were deposited over relatively flat lying Devonian age sedimentary rocks. The majority of this watershed consists of ground moraines and end moraines, with recent glacial outwash deposits within valleys. Sediments deposited by former beach ridges, arranged parallel to the existing Lake Erie shoreline, are composed of sand, gravel and cobble. In some areas, preglacial valleys within the underlying bedrock were buried by glacial clays, sands and gravels down to depths of 200 feet from the ground surface.

Specific to the study area, which is focused on the upper reaches of the watershed, bedrock is exposed within the creek channel near each of the locations being evaluated for a potential barrier (Figure 5). Bedload deposits, where present above the bedrock, consist of sands and silts with a significant amount of platy cobbles. Floodplain deposits of varying thicknesses and degree of vegetation form the creek banks above the shallow bedrock. In Pennsylvania, this bedrock is called the Chadakoin Formation and is a Devonian Age sedimentary deposit. The Chadakoin Formation consists of medium-gray shale, light gray to brownish siltstone, fine-grained sandstone, and conglomerate, and it commonly contains marine fossils (PaGEODE, 2022). Bedding is well developed in many places and generally less than two inches thick (Figure 6). The formation's maximum thickness is about 300 feet. Systematic vertical to semi-vertical jointing is present within the beds and can be seen occasionally in the exposed bedrock within the creek channel and within bedrock bluffs along the creek path. This formation extends into Ohio where it is termed the Ohio Shale and forms the uppermost rock formation beneath Conneaut Creek to its discharge into Lake Erie.

Figure 5: Exposed bedrock within creek channel (Photo: USACE).

Figure 6: Exposed bedrock forming bluff along creek channel (Photo: USACE).

2.3.2 Climate

The Conneaut Creek Watershed experiences four distinct seasons and has a humid continental climate with hot and humid summers and cold winters. It is located in the snow belt that stretches from Cleveland, Ohio to Watertown, New York. Winters are moderately cold, with heavy lake-effect snow, but also with occasional stretches of mild weather that cause accumulated snow to melt.

Climate change is believed by many to already be affecting both the climate of the nation and specifically the Great Lakes region (Environmental Law and Policy Center, 2019). The regional weather extremes in temperature and precipitation are intensifying. In recent decades, a number of changes in the climate of the Great Lakes region have been documented, including a significant warming trend, an increase in extreme summertime precipitation, changing lake levels, and changing trends in lake-effect snows. Warm, wet winters are producing extensive early-season flooding, which threatens people and infrastructures. Further changes in climate, projected over the coming decades, are likely to add significantly to the vulnerabilities and risks to the Great Lakes. Most pertinent to this study are potential changes in precipitation levels and the effects upon the flows of the Conneaut Creek project reach. In accordance with USACE Engineering and Construction Bulletin (ECB) 2018-14 (USACE ECB, 2018), a climate change assessment was performed for the Conneaut Creek watershed (Appendix A-2). The assessment describes observed and projected temperature and precipitation increases, along with potential climate change impacts to the project along Conneaut Creek.

Studies of the effects of climate change on the physiology, behavior, and population dynamics of sea lamprey identify potential benefits to sea lamprey in the Great Lakes. Expected impacts include longer growing seasons, faster larval growth, larger body size, and changes in the availability and locations of spawning habitats. Further study is required to characterize the impacts of climate change on sea lamprey control efforts (Lennox et al*.,* 2020).

2.3.3 Hydrology, Hydraulics, & Fluvial Geomorphology

Conneaut Creek is a direct tributary to the Great Lakes watershed where it drains 191 square miles into Lake Erie at the City of Conneaut, Ohio. The Conneaut Creek Watershed is oriented primarily north to south in the upper corners of Northwestern Pennsylvania and Northeastern Ohio (Figure 1). The creek drains 153 square miles in Crawford and Erie County, Pennsylvania and 38 square miles in Ashtabula County, Ohio. The mainstem of Conneaut Creek is approximately 68 miles from its headwaters to the confluence with Lake Erie. Major tributaries to Conneaut Creek include: Stone Run, Temple Creek, Mud Run, Fish Creek, and East and West Branch Conneaut Creek. No dams currently exist on the mainstem Conneaut Creek, with all 68 miles free flowing to Lake Erie.

The watershed is primarily forested and agricultural land with little development or industry. The largest developed area is the City of Conneaut at the most downstream extent of the watershed. Conneaut Creek also passes through the small communities of Albion, Springboro, and Conneautville, Pennsylvania. Analysis of land cover data from the Multi-Resolution Land Characteristics Consortium's National Land Cover Database (NLCD) shows the Conneaut Creek watershed to be classified as only nine percent developed land in 2019 (NLCD, 2019). The rest of the watershed is classified as 50 percent forested, 29 percent pasture or agricultural land, and 12 percent wetlands/open water. Figure 7 shows the spatial distribution of characterized land use within the watershed. These data also show a less than 0.5 percent change to developed land from 2001 to 2019.

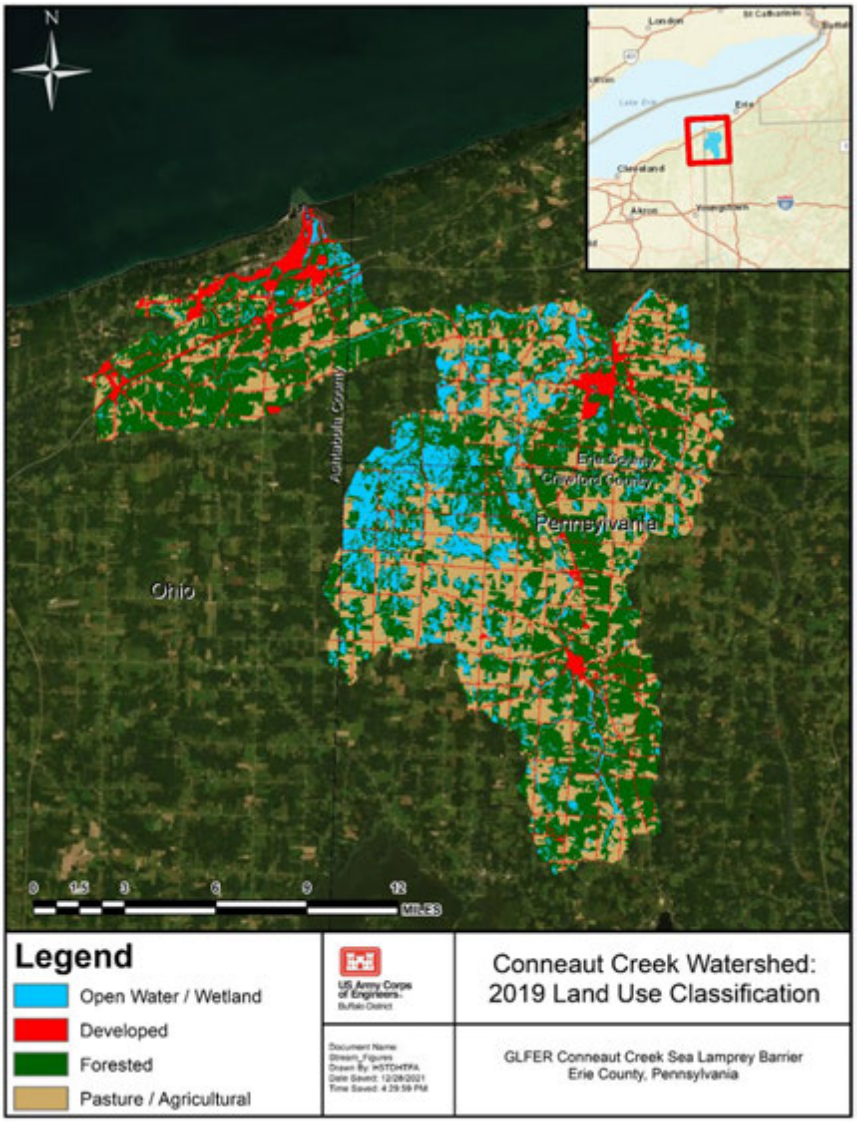


Figure 7: Land Use Classification Within the Conneaut Creek Watershed.

The sparse development within the watershed benefits the riparian habitat and in-stream conditions of Conneaut Creek, both of which are considered high quality. From the NLCD data, approximately 84 percent of the Federal Emergency Management Agency (FEMA) Zone A floodplain, which represents the approximate 1% Annual Chance Exceedance (ACE) floodplain, is classified as forested or wetlands (48% forest, 36% wetland). Only four percent of the floodplain is developed, and the remaining twelve percent is pasture/agricultural land. The high-quality riparian zone and stream corridor was identified not only from landcover and aerial imagery data analyses but also from field observations of the creek.

Figure 8 and Figure 9 show stream conditions within the watershed several miles upstream from the Ohio-Pennsylvania border. Additionally, 21 miles of the 24.5 miles of Conneaut Creek within Ohio have received state scenic river designation and of the 21 scenic river miles, 16.4 are designated as wild (ODNR, 2021).

Conneaut Creek lies within a relatively narrow and steep valley cutting through layers of shale that define the valley walls. The upper reaches of the river exhibit a shallower gradient and wider floodplain than

lower reaches, where at about river mile 28 the gradient of the creek becomes steeper and the valley well defined. Exposed shale bedrock can be observed in many areas of the creek, particularly downstream of river mile 28, with well-defined pool-riffle structure and excellent floodplain access. Observations made of the floodplain and the riparian zone revealed diverse vegetation with floodplain benches and wetlands transitioning from willows, grasses, and shrubs to mature deciduous forest. Preliminary bed sampling identified large, channery-like, cobble sized stones and sandy pools in addition to the exposed bedrock channel bottom. In general, observations moving further upstream favored a slight reduction in stream quality as the stream gradient decreased, with less in-stream structure, a more uniform bed material, and less evident floodplain connections.

Figure 8: Conneaut Creek near Brown Road, looking upstream (Photo USACE).

Figure 9: Conneaut Creek near Griffey Road, looking upstream (Photo USACE).

The Conneaut Creek Watershed experiences 40 – 45 inches of precipitation yearly, and over 100 inches of snowfall per year (NRCC, 2021). A USGS stream gage (USGS 04213000) is located on Conneaut Creek at Keefus Road in the City of Conneaut with a drainage area of 175 square miles. Using this stream gage, a hydrologic analysis for Conneaut Creek was performed using USGS Bulletin 17C log-Pearson Type III distribution (England, 2018). The gage has 85 years of peak flow data on Conneaut Creek from 1923 to 2020, with a gap in the data from 1930 - 1950. The resulting Bulletin 17C Annual Chance Exceedance (ACE) flows at the gage were used to estimate the peak flows at ungaged project sites upstream, in accordance with Koltun, 2019.

ACE flows are the estimated flows that have an X percent chance of occurring in any given year. For example, the 1% ACE flow has a 1% chance of occurring in any given year. ACE flows are often related to a recurrence interval of flooding. A 1% ACE flow event corresponds to a 100-year recurrence interval. However, it is important to note that occurrence of a rare flood does not reduce the chances of additional rare flood events in any given year. The chance of each flow event occurring in any given year is the same regardless of previous events. That is, a 10-year event does not mean an event of that magnitude will only occur once every 10 years, but that it has a 10% annual chance of occurring in any given year. The resulting ACE flows for Conneaut Creek at the USGS gage and upstream near Griffey Road are shown in Table 1. Flow values in this report are also described as a percent exceedance flow. The percent exceedance flow is the flow rate that is exceeded X percent of the time in a selected period, in this case migration seasons. Sea lamprey migration season was defined from March 1st to July 31st and steelhead migration season from August 1st to February 28th. These flows were used to develop barrier and fishway designs.

Table 1: Computed Annual Chance Exceedance Flows at USGS 04213000 and Conneaut Creek near Griffey Road.

Annual Chance Exceedance (Recurrence	Computed Flow at Conneaut Gage (ft^3/s)	Computed Flow at Griffey Road (ft^3/s)
50% (2 Year)	5,942	4,870
20% (5 Year)	8,579	7,180
10% (10 Year)	10,330	8,775
4% (25 Year)	12,550	10,820
2% (50 Year)	14,120	12,390
1% (100 Year)	15,840	13,940
0.2% (500 Year)	19,670	17,670

2.4 Built Environment

Land use in the Conneaut Creek Watershed is still predominantly agricultural and woodland. Riparian forest, vegetated floodplains and adjacent wetlands are responsible for the overall good water quality and healthy aquatic habitats of Conneaut Creek. Most of the urbanization in the watershed occurs in the City of Conneaut, which is located on Lake Erie at the mouth of Conneaut Creek within the State of Ohio. No dams currently exist on the mainstem Conneaut Creek and all 68 miles are free flowing to Lake Erie. Similarly, within the study area between the Ohio-Pennsylvania border at RM 24.5 and the confluence of the East Branch of Conneaut Creek at RM 38.5, the creek corridor is mainly forested and agricultural. Most the land on both sides of the creek is privately owned and, within the Commonwealth of Pennsylvania, the owner of the land owns the stream, including the stream bottom. The only exception to this is on "navigable" waterways. Conneaut Creek within Pennsylvania is not navigable.

Moving upstream from the Ohio-Pennsylvania border through the study area, there are three bridge crossings. At RM 26.25, there are old bridge abutments where Brown Road used to cross Conneaut Creek. The distance between abutments is approximately 100 feet. Continuing upstream, the Griffey Road bridge spans Conneaut Creek at RM 27.5. The Commonwealth owns a 12-acre parcel directly downstream of this location. Further upstream at RM 28.4 is the 6N bridge which is the last bridge crossing within the study area. Lastly, at RM 30.5 are the remaining bridge abutments from the McKee Road bridge which no longer exists. It is assumed that there is regular maintenance associated with the operation of the existing bridges.

In recent years, the rural character of Conneaut Creek has started to change as large tracts have been subdivided for suburban developments. Such development may result in adverse impacts to water quality due to increased runoff from impervious surfaces and any pollutants that are typically found in stormwater (e.g., oil, grease). Lastly, numerous conventional oil wells are scattered throughout the entire study area. Although oil and gas production has not been identified as a source of significant pollution, the potential is present for accidental spills during operation of the wells.

There are no other large existing or planned federal or state projects identified within the study area.

Outside of the study area is an unnamed railway impoundment located on the East Branch of Conneaut Creek west of the Borough of Albion, approximately 0.3 miles upstream from the confluence with mainstem of Conneaut Creek. There is a relict railroad crossing bridge immediately upstream of the impoundment. This impoundment is approximately 5 feet high and 50-feet long and consists of sheet piling with concrete and various other materials.

Approximately 1.2 miles upstream of the railway impoundment on the East Branch is the Bessemer Dam. Limited historic information is available about this structure. Through conversations with stakeholders, however, it was learned that the dam was originally constructed to serve as a water supply for early steam-driven locomotives. The dam is a major impediment to native migrating fishes and mussels to the upstream reaches of the East Branch of Conneaut Creek. The dam is approximately 10-feet high and 110-feet long (Figure 10). Although the structural integrity of the dam appears sound, during high flow events it is evident that water can flank the west side of the structure, which could eventually compromise the integrity of the dam. Currently, the Bessemer Dam acts as an effective barrier to sea lamprey which have not been documented upstream of the impoundment. Additionally, the Bessemer Dam protects a native population of northern brook lamprey (*Ichthyomyzon fossor*), a state listed species. At present, the USFWS chemically treats the East Branch of Conneaut Creek from Conneaut Creek upstream to the Bessemer Dam structure with the lampricide 3-trifluoromethyl-4-nitrophenol (TFM). However, if sea lamprey are eventually able to pass the dam, the upstream segment may need to be treated for sea lamprey, which would be expected to result in adverse effects to the native northern brook lamprey population.

Figure 10: Bessemer Dam on the East Branch of Conneaut Creek, view looking upstream (Photo: USACE).

2.5 Economic Environment

2.5.1 Value of Great Lakes Fishery

Before sea lamprey invasion, Canada and the United States harvested about 15 million pounds of lake trout in the Upper Great Lakes each year (GLFC, 2022). By the late 1940s, sea lamprey populations had exploded. They fed on large numbers of lake trout, lake whitefish, and ciscoes—fish that were the mainstays of the Great Lakes fishery. By the early 1960s, the catch had dropped to approximately 300,000 pounds or about two percent of the previous average. During the time of highest sea lamprey abundance, up to 85 percent of fish that were not killed by sea lampreys were marked with sea lamprey

attack wounds. The once thriving fisheries were devastated, and along with them, the hundreds of thousands of jobs related to the region's economy.

Today, the Great Lakes commercial, recreational, and tribal fisheries are collectively valued at more than $7 billion annually, support more than 75,000 jobs, and are a key feature of the region's economy (Taylor et al. 2013). Lake whitefish, walleye, yellow perch, and ciscoes are the foundation of the commercial fishery, while salmon, walleye, trout, and muskellunge (among many other species) help comprise the recreational fishery (GLFC, 2022).

The total economic significance of the Pennsylvania component of Lake Erie recreational angling industry was estimated to be $49.5 million for the 2016 season (Graefe et al., 2018). Economic significance is a measure of the importance or significance of the recreational angling industry within the local economy as it shows the size and nature of local and non-local economic activity associated with visits to the Pennsylvania section of Lake Erie. Angler expenditures supported approximately 539 jobs within Erie County, Pennsylvania in 2016. Specifically, Conneaut Creek is a popular destination for anglers for its quality steelhead and for smallmouth bass, walleye and northern pike. Further, the high-quality habitat conditions of Conneaut Creek certainly contribute to and help support the entire Great Lakes fishery.

2.5.2 Sea Lamprey Treatment Costs

The USFWS estimates that the current lampricide treatment cost is $192,000 every 2-5 years. As stated earlier, the East Branch Conneaut Creek does not currently need to be treated because the Bessemer Dam acts as a sea lamprey barrier. However, given that during higher flows, water can bypass the dam to the west side thereby jeopardizing the dam integrity and could lead to sea lamprey spread into the East Branch, it is anticipated that the East Branch may need to be treated for sea lamprey in the near future. The USFWS estimates the additional cost to treat the East Branch would be $85,000, resulting in a combined future lampricide cost of approximately $277,000 every 2-5 years (2024 dollars). Continued control of sea lamprey populations is essential to preserve the value of the Great Lakes fishery and its contributions to local and regional economies.

2.6 Real Estate

The study area consists of 83 private parcels of land that have access to Conneaut Creek. All 83 parcels are located within Erie County, Pennsylvania. These 83 private parcels of land are owned by a total of 71 individual property owners. To complete a feasibility study, all 71 property owners received the USACE's Right of Entry forms which grant the USACE the right to conduct surveys on the landowner's property. In addition to the Right of Entries, all 71 property owners also received an information packet from the non-federal sponsor about the potential project.

The Right of Entry campaign was completed by both the USACE and the non-federal sponsor. The USACE drafted the Right of Entries for all 83 parcels and mailed the documents to the property owners who lived outside of the study area but owned land within the study area. The non-federal sponsor took the remaining Right of Entries located within the study area and conducted a door knocking campaign to get more Right of Entries signed. The USACE and the non-federal sponsor hosted two public meetings to inform the local community in an effort to get more Right of Entries signed. The public meetings took place on May 24, 2022 and November 9, 2022.

The USACE and the non-federal sponsor were granted access to 24 parcels of land within the study area via 23 signed Right of Entries (Figure 11).

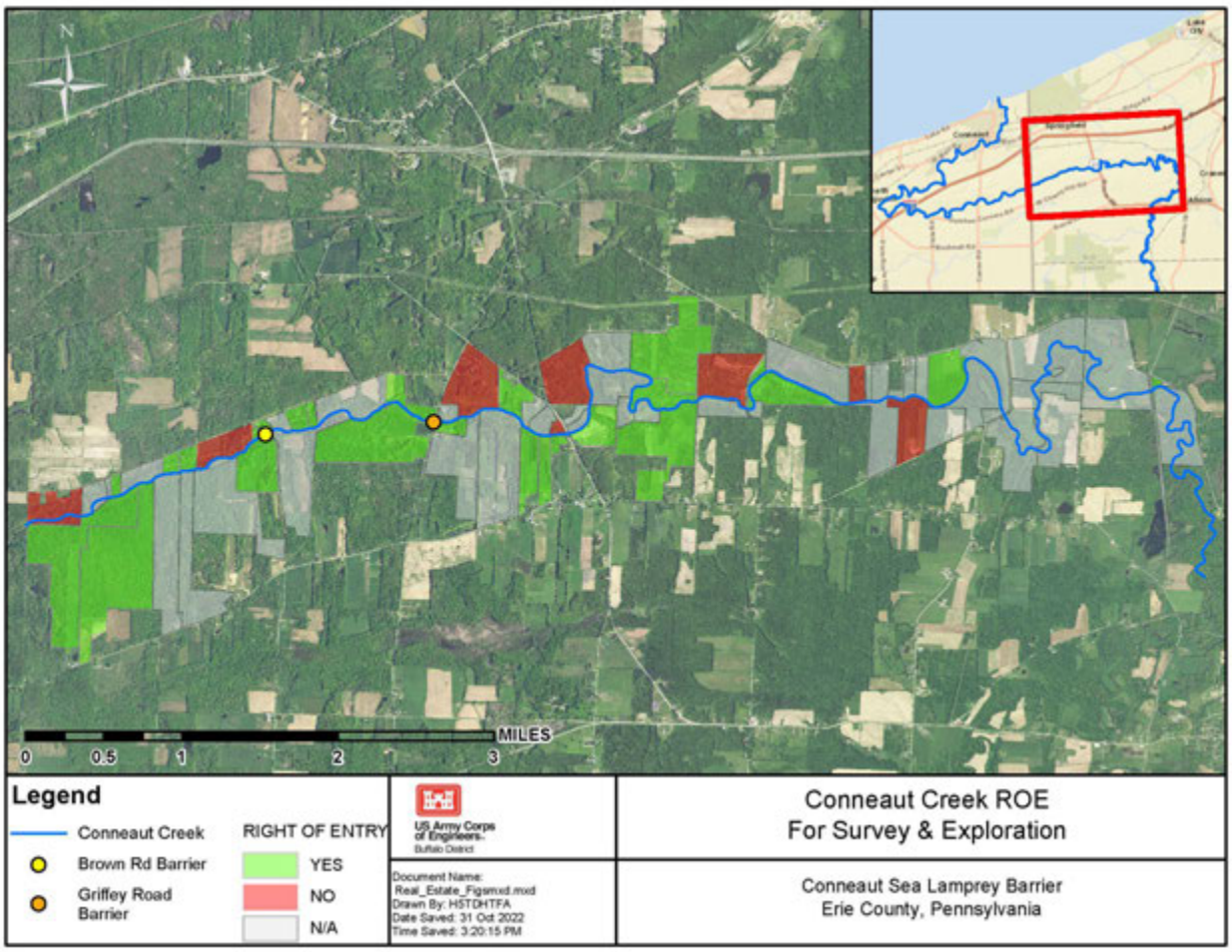


Figure 11: Current map of Conneaut Creek study area showing properties with signed Right of Entries as of November 2022 (N/A = no response).

2.7 Most Probable Future Without-Project Condition

If no federal action were taken to construct a sea lamprey control barrier on Conneaut Creek, the proposed study area would be expected to remain the same in terms of river hydraulics, geomorphology, non-native species, TFM treatments and habitat impacts. Without a federal project to block the passage of sea-lamprey in this stream, TFM treatments will likely continue at current application rates and there will be continued risk of negative impacts to some native species in Conneaut Creek. Additionally, ongoing deterioration and potential failure of Bessemer Dam will require that the majority of the East Branch Conneaut Creek will need to be treated in the future. This also poses a risk of impacts to a native population of northern brook lamprey, a state listed species.

Section 3 Plan Formulation and Evaluation

To ensure sound decisions are made with respect to alternative development and ultimately with respect to plan selection, the plan formulation process requires a systematic and repeatable approach. This chapter presents the results of the plan formulation process. Plan formulation was conducted in accordance with existing laws, regulations, policies, and the authorizing resolution, which limits the study to restoration of the fishery, ecosystem, and beneficial uses of the Great Lakes. Section 506 of the WRDA of 2000, as amended, specifically limits the federal contribution to $10,000,000 or less. Alternatives were developed in consideration of study area problems and opportunities as well as study objectives and constraints with respect to the four evaluation criteria described in the Principles and Guidelines (completeness, effectiveness, efficiency, and acceptability).
The general objective of the feasibility study is to determine if there are engineeringly feasible measures and alternatives that would prevent or significantly reduce the numbers of sea lamprey from reaching nearly 50 river miles of spawning habitat in Conneaut Creek, thereby reducing the need to use lampricide.

As directed in the "Comprehensive Documentation of Benefits in Decision Document" policy directive dated January 5, 2021, plan formulation must equally consider the national economic development (NED), regional economic development (RED), environmental quality (EQ), and other social effects (OSE) accounts. Plans to address ecosystem restoration are based on their non-monetary benefits, typically in terms of habitat output units.

3.1 Planning Framework

The guidance for conducting civil works planning studies, Engineering Regulation (ER) 1105-2-100, Planning Guidance Notebook, requires the systematic formulation of alternative plans that contribute to the federal objective. The Planning Guidance Notebook is being updated and ER 1105-2-103, Policy for Conducting Civil Works Planning Studies, superseded Chapters 1 through 2 of the Planning Guidance Notebook in December 2023, but does not contain significant changes in guidance or policy for the implementation of Planning studies. As described in Section 1.2, this process consists of a series of six steps that provide an orderly and systematic approach to select a recommended plan. Plan formulation and evaluation is an iterative process, whereby the steps may be repeated as new information becomes available, new alternatives are developed, or planning objectives are reevaluated.

As directed in the "Comprehensive Documentation of Benefits in Decision Document" policy directive dated January 5, 2021, and incorporated into ER 1105-2-103, when planning for the restoration of environmental resources, cost effectiveness and incremental cost analyses (CE/ICA) may be used as tools for the comparison of alternative plans. Cost effectiveness and incremental cost analyses are comparisons of the effects of alternative plans; more specifically, they involve comparisons between the outputs and costs of different solutions. Prior to using CE/ICA, at least preliminary information about alternative plans and their effects must be developed in order to conduct the cost effectiveness and incremental cost comparisons.

The planning framework described in Engineer Circular (EC) 1105-2-404 "Planning Civil Works Projects under the Environmental Operating Principles" was used for this study. The methodology described in EC 1105-2-404 includes the following steps:

1. Define problems and opportunities for ecosystem restoration;
2. Inventory and forecast, including analyzing the significance of resources to be affected and forecasting the without project condition;

3. Plan formulation, including identifying all reasonable management measures and formulating alternative plans to address the primary purpose of the study (i.e., ecosystem restoration);
4. Evaluate effects of alternative plans, including developing decision criteria, identifying cost effective plans, analyzing trade-offs, ranking plans, and justifying the highest ranked plan; and
5. Compare alternative plans; and
6. Plan selection.

3.2 Assumptions

To support plan formulation, the following assumptions were made:

- Sea lamprey barrier measures may impact public safety, so an appropriate safety plan(s) must be developed to reduce and mitigate potential public safety impacts.

3.3 Management Measures

Management measures are features of activities that can be implemented at a specific geographic location to address one or more planning objectives and avoid constraints. A preliminary list of measures was developed collaboratively with the GLFC, USFWS, and Pennsylvania Fish and Boat Commission (PFBC), drawing upon previously implemented barriers, recent studies, and current research in the field of sea lamprey control.

3.3.1 Preliminary Measures

Zielinski et al., 2019 provides a comprehensive review of sea lamprey barrier technologies that have been utilized throughout the Great Lakes. The barrier technologies described in this review were used as a starting point for possible barrier measures for Conneaut Creek.

Barrier Measures

Fixed Crest Barriers - Fixed-crest barriers are the most common types of sea lamprey barrier in the Great Lakes basin and have been proven to be very effective at blocking sea lamprey movement (Zielinski et al., 2019). Fixed-crest barriers typically have a lip on top to prevent lamprey from using their suction mouth to pull themselves over the barrier. The barrier needs to provide at least 18 inches of elevation difference between barrier crest and tailwater to prohibit lamprey from getting over the barrier.

The design best practice for sea lamprey barriers is a structure with a crest elevation that provides an 18-inch drop to the tail water elevation up to as high a flood event as possible given possible site constraints (i.e., flood conveyance, public safety, property issues, etc.). While designing for high flood events is very effective at blocking sea lamprey, it is sometimes infeasible due to changes in watershed hydrology, potential formation of an impoundment upstream, and acceptance from the community. Lower fixed barriers can be effective at blocking sea lamprey when combined with other barrier types. One such example is the combined low fixed crest and electric sea lamprey barrier on the Ocqueoc River, Michigan. Installed in 1999, the electrical barrier is only energized when the 18-inch vertical drop is compromised.

Adjustable Crest Barriers - Seasonal and adjustable-crest barriers are similar to fixed crest barriers, except the crest height can be adjusted manually or automatically (Zielinski et al., 2019). This barrier type has the advantage that it can be seasonally operated to block sea lamprey movement when adults are moving into the tributaries to spawn. The remainder of the year, the barrier can be removed, or the crest

lowered to pass flow, debris, sediment, boats and resident fish and macroinvertebrates. Generally, adjustable crest barriers are limited to lower crest elevations due to construction, operation and cost constraints. Lower adjustable crest barriers can be effective at blocking sea lamprey when combined with other barrier types.

Electrical Barriers - Low-voltage electricity can serve as a potential barrier to fish passage because a portion of the energy applied to water is transferred to fish which can lead to taxis (forced swimming), immobilization, and possibly trauma (Noatch and Suski, 2012). Electrical barriers have a long history in the sea lamprey control program, with the first systems introduced to the Great Lakes during the 1950s (Hunn and Youngs, 1980) and reaching a peak of 162 sites by 1960 (Lavis et al., 2003). While use of electricity as a stand-alone barrier to sea lamprey has declined over the last few decades, research continues on the potential of portable electrical systems to deter sea lamprey passage and enhance trapping. As previously noted, this technology can be combined with a low fixed crest to increase effectiveness as was implemented on the Ocqueoc River, Michigan.

Weirs and Screens - This barrier technology utilizes weir panels or mesh screens that block sea lamprey while still passing water. This barrier type is difficult to maintain under high flows or in systems with large amounts of woody debris because the debris collects on the barrier not allowing water to pass, and the barrier is overtopped.

Velocity Barriers - Hydraulic conditions can be manipulated to create regions of fast flowing water that cause fish to exhaust their physiological swimming capabilities during passage attempts (i.e., velocity barriers). Velocity barriers can be characterized by extremely high velocities over short distances or more moderate velocities over a greater distance.

Non-Structural Barriers - Non-physical barrier technologies utilize deterrent stimuli like, sound, light, or chemicals (e.g., carbon dioxide, chemosensory cues) have been suggested for sites where alteration of water flow is undesirable. These barrier technologies can be used in combination with other more proven technologies to increase overall effectiveness or for trap guidance.

Fish Passage Measures

Fish passage is a critical feature of each barrier considered in Conneaut Creek. Most notoriously, Conneaut Creek is home to a large steelhead trout run from Lake Erie extending upstream of the potential barrier locations. Fish passage must be implemented for the project to ensure steelhead and other native fish species are able to move upstream past the sea lamprey barrier.

Trap and Sort - Sea lamprey traps can be incorporated into the downstream side of physical barriers to allow for removal of sea lamprey downstream of a barrier to reduce spawning populations and potentially reduce success in downstream areas of the creek. Native fish that are caught in traps can be sorted and passed upstream of the barrier to reduce negative impacts of the barrier to native fish and other aquatic species populations (e.g., freshwater mussels). Outside of this season, the trap can be removed so no sorting is required.

Fishways - Seasonally operated fishways integrated into a physical barrier allow fish to freely migrate upstream of the barrier after the sea lamprey spawning season. These fishways would not be operated during the sea lamprey migratory period to prevent free living adult sea lamprey from passing upstream. There is little concern that sea lamprey in the parasitic phase (attached to a fish) will pass through a fishway when they are open during the non-sea lamprey spawning period because the parasitic phase occurs in the open lake (refer to Figure 3). Further, parasitic phase juveniles are not sexually mature and

cannot survive long enough in a stream to become sexually mature to pose a risk if they get upstream of a barrier.

The types of fishways considered for this study include: jumping pools; vertical slot; Denil; and natural bypass channel. Jumping pools are positioned downstream of a barrier and allow most jumping fish to pass over the barrier using their jumping ability. Vertical slot fishways utilize a series of pools with slotted entrances to each pool that extend to the bottom of the fishway channel. This accommodates a variety of fish and other aquatic species to move upstream through the slots and rest in the pools. The Denil fishway does not create a series of pools like many other fishway designs, instead it uses closely spaced baffles to create a low velocity zone for fish to ascend. The main advantage of Denil fishways is that they can be built on steeper slopes than pool-type fishways as the vertical slot design. Natural bypass channels are usually low gradient earthen channels that mimic the structure of natural streams. While there are advantages to natural bypass channels, the additional area required for a natural bypass channel compared to other fishways designs can be an issue for projects with space constraints. The appropriate fishway measure(s) will be dependent upon the barrier measure(s) being considered for a given project alternative.

Recreation Measures

Portage – Portages are land routes used by paddlers to transport their boats around obstructions that interrupt a paddling route. A portage would reduce the negative impacts of a physical barrier to the paddling community by providing direct access to areas of water downstream of a physical barrier.

3.3.2 Screening of Measures

The measures under consideration were initially screened based upon a variety of factors including effectiveness at blocking sea lamprey, environmental acceptability, safety, constructability, operations and maintenance acceptability, and real estate considerations. In collaboration with representatives from the GLFC, USFWS – Sea Lamprey Control Program, PFBC, PADEP, Pennsylvania SeaGrant, and the USACE PDT, determinations were made regarding which measures should be retained for formulation of alternative plans. This screening process is summarized in Table 2.

Table 2: Screening of measures.

MEASURES	Measure Screening Justification	RETAIN? (Y/N)
Barrier Measures		
Fixed Crest - High (10% + 18")	USFWS gold standard for sea lamprey control barriers, however, adverse impacts associated with magnitude of barrier is unacceptable to PA and partners. Retained for NEPA alternative comparison purposes.	Yes
Fixed Crest Low (9-50% ACE + 18")	Possibly acceptable. Needs to be combined with an additional barrier type to increase effectiveness.	Yes
Electrical	Temporary electrical barriers are commonly deployed to block sea lamprey. Could be combined with other barrier technologies to increase effectiveness.	Yes
Seasonal and Adjustable-Crest	Obermeyer or inflatable rubber barrier could be operated seasonally during the sea lamprey migratory period (Mar-Jun) to reduce H&H impacts of a barrier.	Yes
Weirs and Screens	Due to the size and amount of large wood in the creek system, this measure is screened out. This barrier type was installed on Morpion Creek (much smaller system) and requires daily debris clearing. O&M requirements are unacceptable.	No
Velocity Barriers	Preliminary assessment of crest length needed for a velocity barrier is not practical or likely acceptable. Needs to be combined with an additional barrier type to increase effectiveness.	No
Non-Structural Barriers - Chemosensory, carbon dioxide, sound/bubbles, strobes/ continuous lights	Due to the experimental nature of non-physical barrier measures, they are currently not being considered in this alternative formulation. Once a focused array of alternatives is established, we will revisit non-physical barrier types as an add-on.	No
Fish Passage Measures		
Trap and Sort	Used to trap lamprey downstream of the barrier. Native fish caught can be sorted and passed upstream.	Yes
Fishways - Jumping Pool, Denil, Slotted Fishway, Pool Weir, Bypass Channel	Jumping pool will likely be incorporated into most alternatives when appropriate as a bare minimum for fish passage.	Yes
Recreation Measures		
Portage	Paddle sports are popular on Conneaut Creek and a portage is likely needed if a physical barrier is pursued.	Yes

3.4 Arrays of Alternatives

Alternatives are a set of one or more management measures functioning together to address one or more planning objectives. Based upon the screening of measures described in Section 3.3.2 and expert input from GLFC, USFWS – Sea Lamprey Control Program, PFBC, PADEP, and Pennsylvania SeaGrant, those measures that were not eliminated from further consideration were combined to create an initial array of alternative plans that warrant further investigation. These alternatives were formulated over the course of many meetings with the USFWS – Sea Lamprey Control serving as experts in the field of sea lamprey control and purpose-built sea lamprey barriers. Combinations of barrier and fish passage measures identified for each alternative relied on the best professional judgement of the experts.

3.4.1 Initial Array of Alternatives

A total of seven alternatives were developed including the no action alternative (Table 3). The alternatives and brief descriptions are presented below.

Table 3: Initial array of alternatives.

Alternatives	Barrier Measures		Passage Measures			
	Primary	**Secondary**	**Primary**	**Secondary**	**Tertiary**	**Recreation**
No Action	-	-	-	-	-	-
1	Fixed Crest – High	N/A	Trap & Sort	Denil Fishway	N/A	Portage
2	Electric	N/A	Trap & Sort	N/A	N/A	Portage
3a	Fixed Crest – Low	Electric	Trap & Sort	Slotted Fishway	Jumping Pool	Portage
3b	Fixed Crest - Low	Electric	Trap & Sort	Natural Bypass Channel	Jumping Pool	Portage
4a	Adjustable – Low Crest (Obermeyer)	Electric	Trap & Sort	Jumping Pool	N/A	Portage
4b	Adjustable – Low Crest (Inflatable Rubber Dam)	Electric	Trap & Sort	Jumping Pool	N/A	Portage

No Action Alternative - The USACE is required to consider the "No Action" alternative in order to comply with the requirements of the NEPA. The No Action alternative assumes that no federal action will be taken to construct a sea lamprey control barrier on Conneaut Creek. The No Action Alternative forms the basis from which all other alternative plans are measured. The proposed study area would be expected to remain the same in terms of river hydraulics, geomorphology, non-native species, TFM treatments and habitat impacts. Without the installation of a sea lamprey barrier and trap on this stream, TFM treatments will not be reduced resulting in a continuing negative impact to some of the native species in Conneaut Creek. Additionally, the majority of the East Branch Conneaut Creek does not need to be treated because the Bessemer Dam currently acts as a sea lamprey barrier and also protects a native population of northern brook lamprey, a state listed species. However, given that during higher flows, water can bypass the dam to the west side thereby jeopardizing the dam integrity and could lead to sea lamprey spread into the East Branch, it is anticipated that the upstream segment may need to be treated for sea lamprey in the near future, adversely affecting the native northern brook lamprey population.

Alternative 1: Fixed – High Crest (10% ACE + 18"), Trap & Sort, Denil Fishway, Portage - A high fixed crest sea lamprey barrier alternative was developed because it represents the GLFC "gold standard" for sea lamprey barriers with a crest elevation that provides an 18 inch drop to the tail water elevation at the 10% ACE (Figure 12). A sea lamprey trap incorporated into the downstream side of barrier will allow for removal of sea lamprey downstream to reduce spawning populations and potentially reduce success in downstream areas of the creek. Native fish that are caught in traps can be sorted and passed upstream of the barrier to reduce negative impacts of the barrier to native fish and other aquatic species populations (e.g., freshwater mussels). Outside of this season, the trap can be removed so no sorting is required. During the sea lamprey non-spawning period, a Denil fishway is the appropriate fish passage measure to accommodate the steep-slope needed to overcome the high crest height of the barrier. A portage is included to provide a land route around the barrier for paddlesports. Due to the relatively high crest height of Alternative 1 and the associated degree of the upstream inundation, additional alternatives were evaluated that have less inundation impacts.

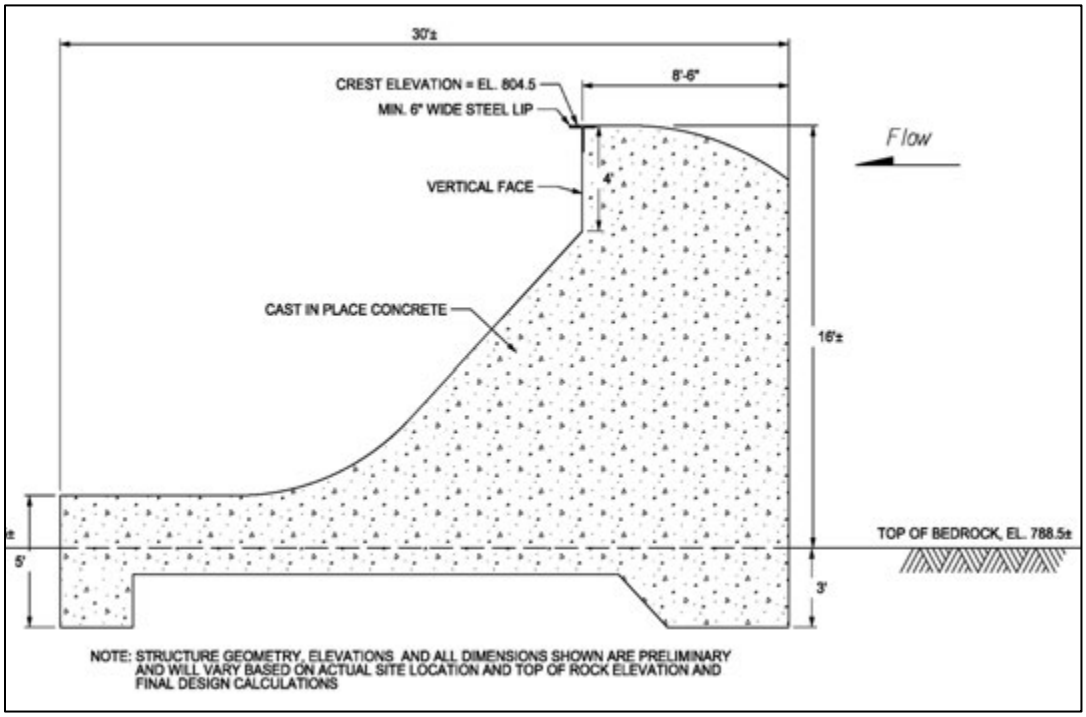


Figure 12: Alternative 1 – plan view and cross-section.

Alternative 2: Electric, Trap & Sort, Portage - This alternative includes an electrical barrier with trap and sort fish passage (Figure 13). This barrier relies on an electrical array being operated seasonally during the sea lamprey migration period and then turned off the rest of the year. The electrodes would be placed in conduits on the bottom of the stream and operated to have an effected electrical field that will stun lamprey as they attempt to move upstream. There would be no inundation associated with this type of barrier. However, this type of barrier would block passage of all species upstream and only fish collected in the trap will be sorted and those native species and highly valued sportfishes will be passed upstream of the barrier during the sea lamprey spawning period. During the non-spawning period, no fish passage measure will be needed because the electrical barrier will be turned off. There are concerns associated with this barrier potentially impacting downstream outmigration of native species during the March – July sea lamprey run time period when the electrical barrier would be operated. A portage is included to provide a land route around the barrier for paddlesports.

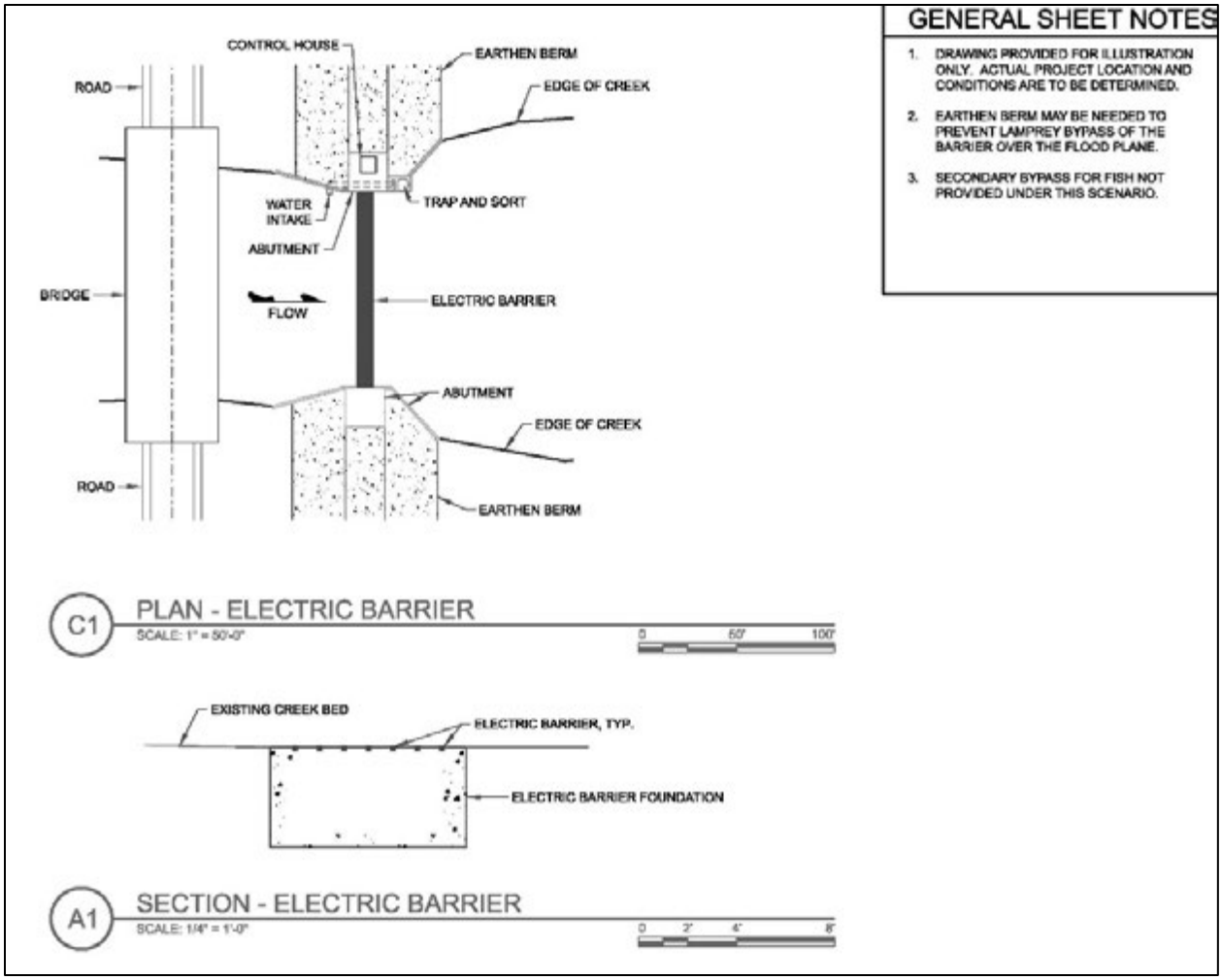


Figure 13: Alternative 2 – plan view and cross-section.

Alternative 3a: Fixed Crest – Low (99% ACE + 18"), Electric, Trap & Sort, Slotted Fishway, Jumping Pool, Portage - A fixed low crest barrier and electrical barrier with trap and sort, slotted fishway, jumping pool and portage (Figure 14). This barrier is similar to the Ocqueoc River barrier previously discussed with a slotted fishway that can provide passage of fish during the non-lamprey run season. Then, fish collected in the trap will be sorted where native fish and highly valued sportfishes will be passed upstream during the lamprey spawning run. The additional fish passage measure of a jumping pool will allow species with the required jumping ability to gain upstream access year-round. The electrical barrier would only be turned on when flows increase and there is less than an 18-inch drop to the tail water elevation. The electrical barrier turns back off once the flows decrease and the 18-inch drop to tailwater elevation is maintained. The slotted fishway is usually set to a lower grade and works over a wider range of flows than other engineered fish passage structures, enabling a wider range of fish species and size ranges of fish to be passed over the structure. A portage is included to provide a land route around the barrier for paddlesports.

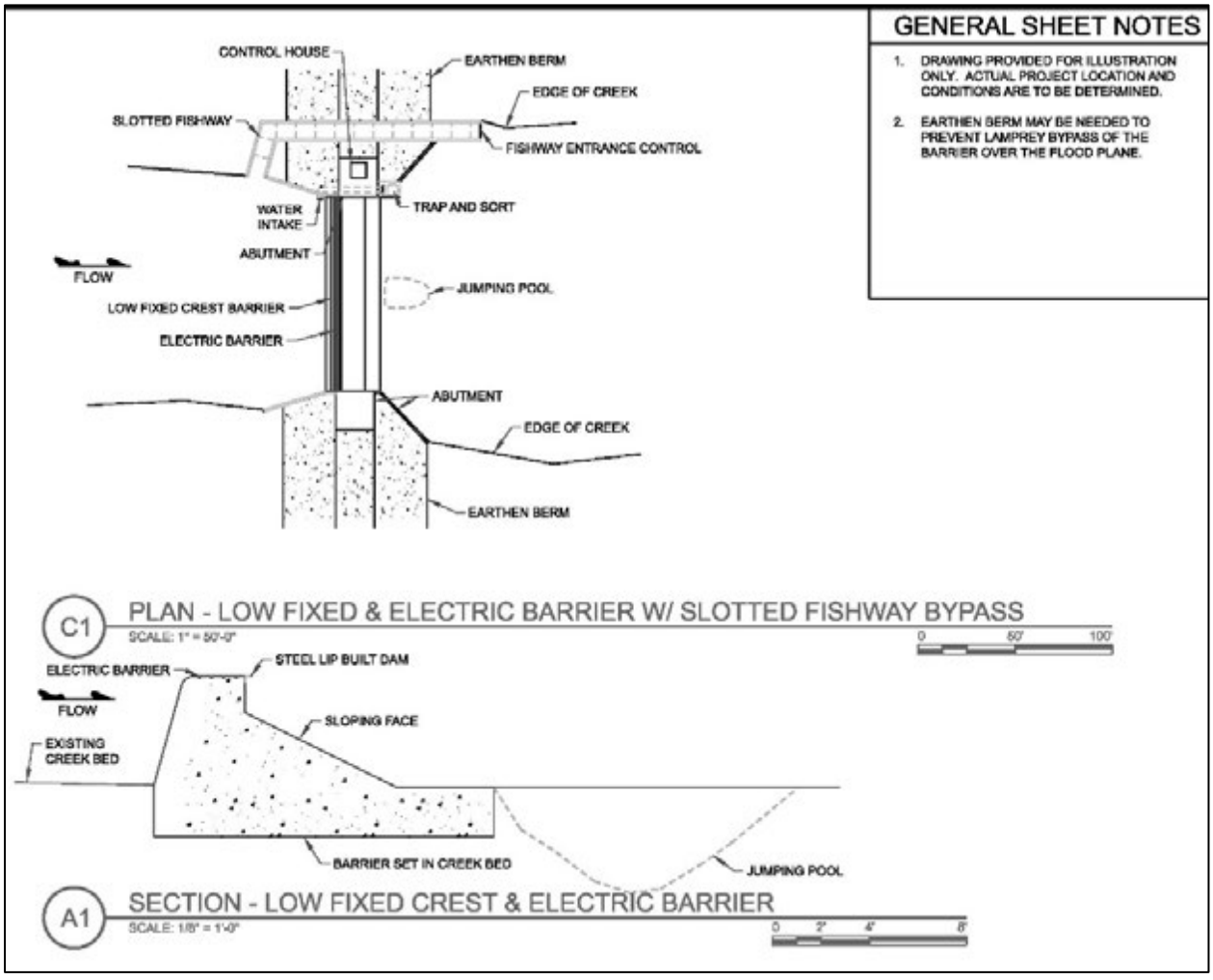


Figure 14: Alternative 3a – plan view and cross-section.

Alternative 3b: Fixed Crest - Low (99% ACE + 18"), Electric, Trap & Sort, Natural Bypass Channel, Jumping Pool, Portage - A fixed low crest barrier and electrical barrier with trap and sort, natural bypass fishway, jumping pool and portage (Figure 15). This barrier is similar to Alternative 3a with the exception of a natural bypass fishway which usually has the lowest gradient and passes the widest range of species over a wide range of flows. The main difference is this requires more space due to its shallower slope. This alternative was screened out due to Brown Road and Griffey Road sites not having adequate space to implement a natural bypass channel around the barrier. A portage is included to provide a land route around the barrier for paddlesports.

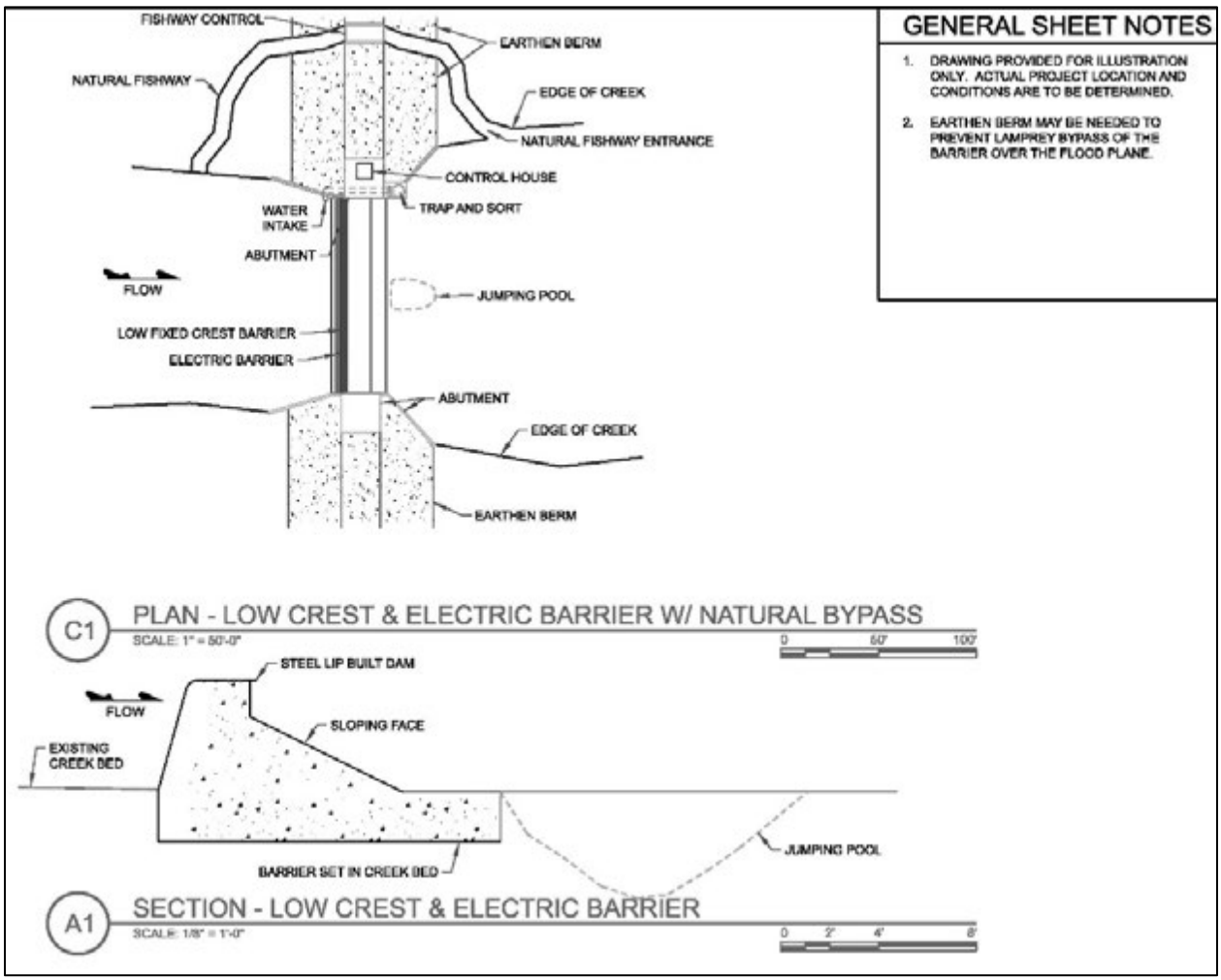


Figure 15: Alternative 3b – plan view and cross-section.

Alternative 4a: Adjustable Crest - Low (Obermeyer), Electric, Trap & Sort, Jumping Pool, Portage - An adjustable low crest barrier that uses an Obermeyer gate and electrical barrier with trap and sort, jumping pool and portage (Figure 16). This barrier has an adjustable height section that uses a steel plate hinged to the bottom with an air bladder behind it that is inflated or deflated with air pressure from a compressor to adjust the height of the barrier. This type of barrier can be adjusted over a wide range of flows to maintain a suitable barrier while potentially reducing inundation duration when compared to other types of structures. This type of structure requires more equipment when compared to other barriers and may require additional operation and maintenance costs. During the sea lamprey spawning season the trap and sort system will be used to pass fish upstream and the barrier will be in the down position during the non-lamprey spawning season allowing open fish passage. The additional fish passage measure of a jumping pool will allow species with the required jumping ability to gain upstream access during the sea lamprey spawning season. A portage is included to provide a land route around the barrier for paddlesports.

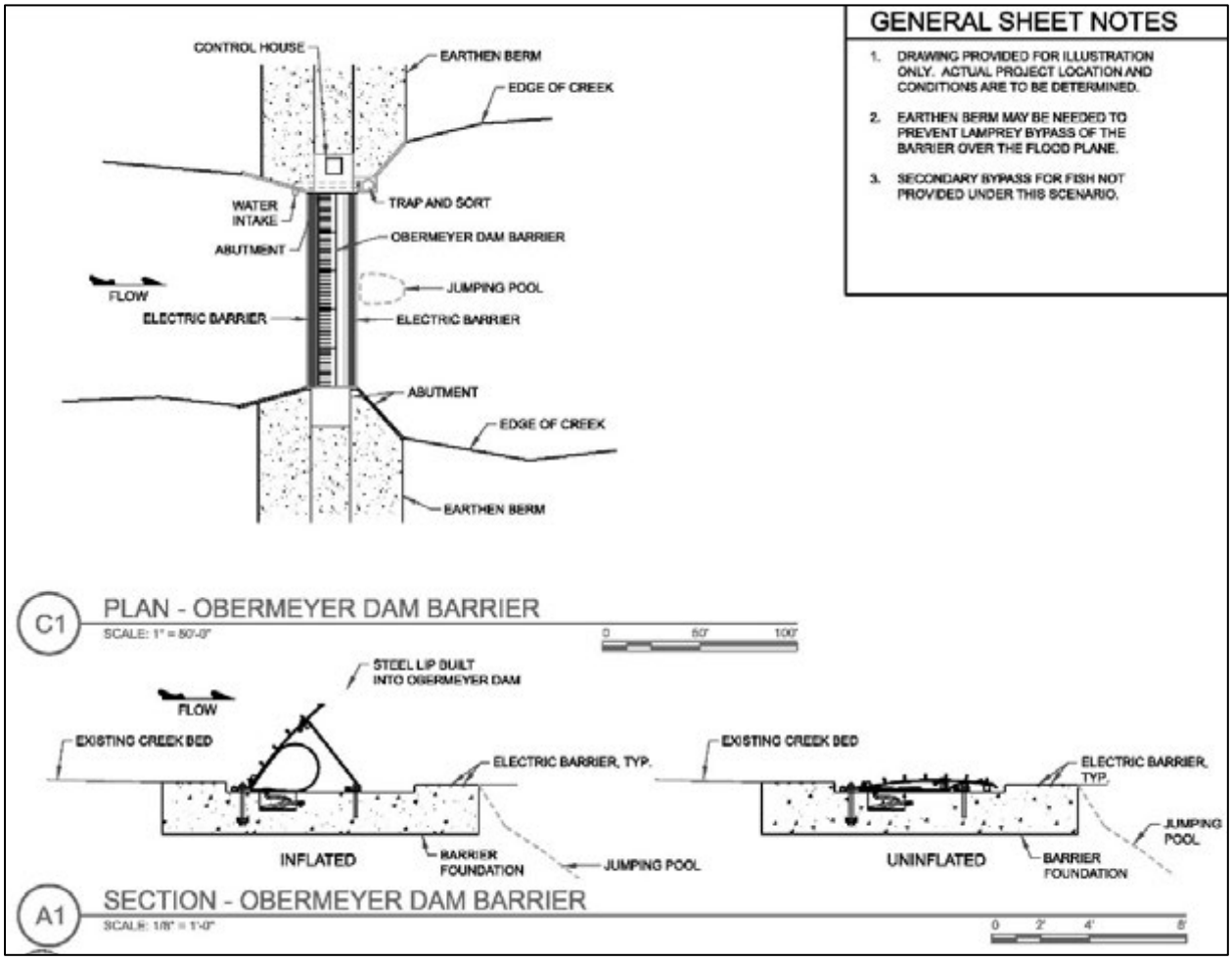


Figure 16: Alternative 4a – plan view and cross-section.

Alternative 4b: Adjustable – Low Crest (Inflatable Rubber Dam), Electric, Trap & Sort, Jumping Pool, Portage - An adjustable low crest barrier that uses a rubber dam and electrical barrier with trap and sort, jumping pool, and portage (Figure 17). This barrier is similar to Alternative 4a with the exception of a rubber bladder being the adjustable dam portion. This alternative was preliminarily screened out due to operability and effectiveness concerns from the project partners. A portage is included to provide a land route around the barrier for paddlesports.

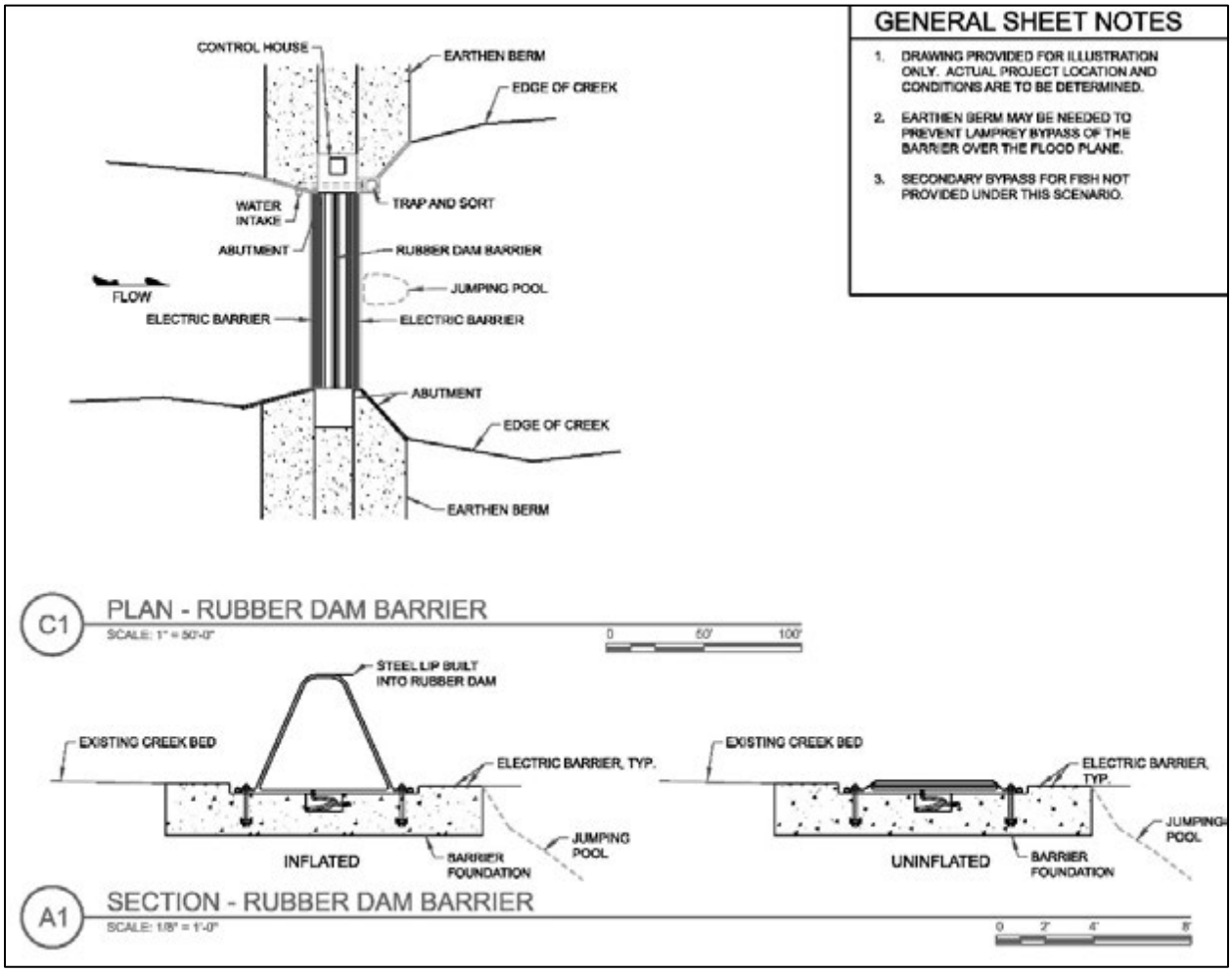


Figure 17: Alternative 4b - plan view and cross-section.

3.4.2 Screening of Alternatives

The initial array of alternatives was screened using the four evaluation criteria identified in the P&G: acceptability, completeness, effectiveness, and efficiency. Within the context of this study, the four evaluation criteria are further defined as follows:

- **Acceptability:** The acceptability metric refers to the viability and appropriateness of an alternative from the perspective of the Nation's general public and consistency with existing federal laws, authorities and public policies. This criterion considers level of support an ecosystem restoration plan has from state and federal resource agencies, local governments, the non-federal sponsor, and the general public.
- **Completeness:** A plan must provide and account for all necessary investments or other actions

needed to ensure realization of the planned restoration outputs, including real estate, operation and maintenance, and sponsorship factors. The completeness metric considers how well the plan can be implemented with respect to the constraints and considerations identified for this study. For this study, the completeness metric was evaluated with respect to the ability to acquire necessary real estate and extent of operation and maintenance required.

- **Efficiency:** The efficiency metric considers whether the plan is cost effective. The efficiency metric considers all costs related to implementation of one alternative against the other alternatives. Qualitative estimates of cost effectiveness were used to screen the initial array of alternatives.
- **Effectiveness:** The effectiveness metric considers the ability of the plan to address the specified restoration problems or opportunities and achieve the project objectives. In the context of this study, the effectiveness metric considers the ability of the plan to stop sea lamprey migration, thereby reducing the amount of lampricide required to treat Conneaut Creek, and to maintain or improve stream habitat quality for native biota.

With the exception of the No Action alternative, each alternative was evaluated based on its ability to satisfy the four evaluation criteria (Table 4). Alternatives that were unable to meet one of the four criteria were screened from further consideration. This screening process resulted in elimination of alternatives 3b and 4b. Alternative 3b did not meet the completeness criteria, as sufficient real estate was not available to support construction of the bypass channel. Alternative 4b did not satisfy the acceptability, completeness, or effectiveness criteria due to concerns regarding operability of the inflatable barrier and the capacity of the barrier to sufficiently block sea lamprey passage.

Table 4: Results of screening initial array of alternatives.

Alternatives	A	C		EC	EF		
		RE	O&M		O1&2	O3	CV
1	Low	Low	High	Moderate	High	Low	Yes (2)
2	Moderate	High	Moderate	Moderate	Low	High	No
3a	Moderate	Moderate	Moderate	Moderate	High	Moderate	No
3b	Moderate	Screen	Moderate	Moderate	High	Moderate	No
4a	Moderate	Moderate	Moderate	Moderate	Low	Moderate/High	No
4b	Moderate	Moderate	Screen	Moderate	Low	Screen	No

Legend: A = Acceptability; C = Completeness; RE = Real Estate attainability; O&M = Operations and Maintenance acceptability; EC = Efficiency; EF = Effectiveness; O1&2 = Objective 1 (sea lamprey barrier effectiveness) and Objective 2 (reduce need for lampricide); O3 = Objective 3 (maintenance of stream habitat quality for native biota); CV = Constraints violated with the number of constraints in parentheses.

3.4.3 Final Array of Alternatives

The final area of alternatives consists of four alternatives, including the no action alternative. Table 5 lists the final array of alternatives and measures used in each alternative. Using conceptual designs, rough order of magnitude costs for design, construction, and operations and maintenance were developed for each alternative (Table 6, Appendix A-4). Alternatives 3b and 4b of the initial array of alternatives were screened out due to operability concerns and space constraints at the potential project sites. Alternative 1 has been identified as unacceptable by the project partners due to the magnitude of the barrier and associated upstream inundation impacts; however, it is retained in the final array of alternatives for comparative purposes as it represents the alternative that would likely have the greatest adverse impacts. These remaining three alternatives; electric only barrier, low fixed crest, and low adjustable crest (Obermeyer) were evaluated using HEC-RAS modeling.

Table 5: Final array of alternatives.

Alternatives	Barrier Measures		Passage Measures			
	Primary	Secondary	Primary	Secondary	Tertiary	Recreation
No Action	-	-	-	-	-	-
1	Fixed Crest – High		Trap & Sort	Denil Fishway		Portage
2	Electric		Trap & Sort			Portage
3a	Fixed Crest – Low	Electric	Trap & Sort	Slotted Fishway	Jumping Pool	Portage
4a	Adjustable Crest – Low (Obermeyer)	Electric	Trap & Sort	Jumping Pool		Portage

Table 6: Rough order of magnitude cost estimates for each alternative plan.

Alternative	Description	Cost Estimate
No Action	Continued Lampricide Treatment Every 2-5 Years	N/A
1	Fixed – High Crest (10% + 18"), Trap & Sort, Denil Fishway	$6,484,300
2	Electric, Trap & Sort	$3,740,867
3a	Fixed Crest – Low, Electric, Trap & Sort, Slotted Fishway, Jumping Pool	$5,332,427
4a	Adjustable Crest - Low (Obermeyer), Electric, Trap & Sort, Jumping Pool	$6,076,071

3.5 Site Selection

Seven potential sites for a sea lamprey control barrier were selected for a site visit conducted by PFBC and PADEP on July 2, 2020. Three of these sites were screened out during the federal interest determination assessment based upon the high levels of upstream inundation and number of properties impacted by inundation. The remaining four sites were further investigated and evaluated in 2021. As a result of this evaluation, the two sites furthest upstream (McKee and 6N) were determined to be infeasible based upon the potential barrier heights and associated level of upstream inundation and parcels impacted. Furthermore, positioning the barrier at the Brown Road or Griffey Road sites minimize the amount of creek that must be treated with lampricide and reduces the amount of suitable habitat for sea lamprey spawning. Detailed H&H modeling and evaluation conducted for the Brown and Griffey Road sites are described in Appendix A-2.

Brown Road Site

Brown Road is an old road over Conneaut Creek approximately 1.75 river miles from the Pennsylvania/Ohio state line. The bridge no longer exists, but concrete abutments on left and right banks are still in place. A sea lamprey barrier at this location would benefit from using the existing abutments from the original bridge as its own, placing the barrier in between them (Figure 18). The LiDAR data indicates that the high ground on right of bank, presumably the old roadway embankment, is above the 5% ACE flood elevation and currently acts as an encroachment within the floodplain. The left of bank however is much lower and would require fill up to the 1% ACE plus 18-inch elevation to create a suitable embankment for the barrier that also prevents upstream lamprey migration. The condition of the existing abutments and embankments needs to be determined and some improvements may need to be

made to ensure they are structurally sound, but modeling indicates that they are currently loaded under high flow conditions. Additionally, this location is located the furthest downstream, providing more protection against sea lamprey than other sites on Conneaut Creek in Pennsylvania.

Griffey Road Site

The Griffey Road Bridge is located roughly 1.25 river miles upstream from the Brown Road site. A sea lamprey barrier at this site would be placed just downstream of the bridge as shown in Figure 19. The barrier would utilize the existing bridge abutment on the right of bank and tie into a steep, exposed shale wall on the left of bank. Placing the barrier here helps minimize impacts to the WSE (water surface elevation) due to the significant encroachment to the floodplain already created by the Griffey Road bridge. The roadway embankment is already loaded during out of bank flow events but may need additional protection for seepage or permanent loading at toe of embankment due to a sea lamprey barrier. The parcel downstream of Griffey Road on the right of bank is owned by the Commonwealth of Pennsylvania; therefore, additional access and real estate benefits may exist at this site.

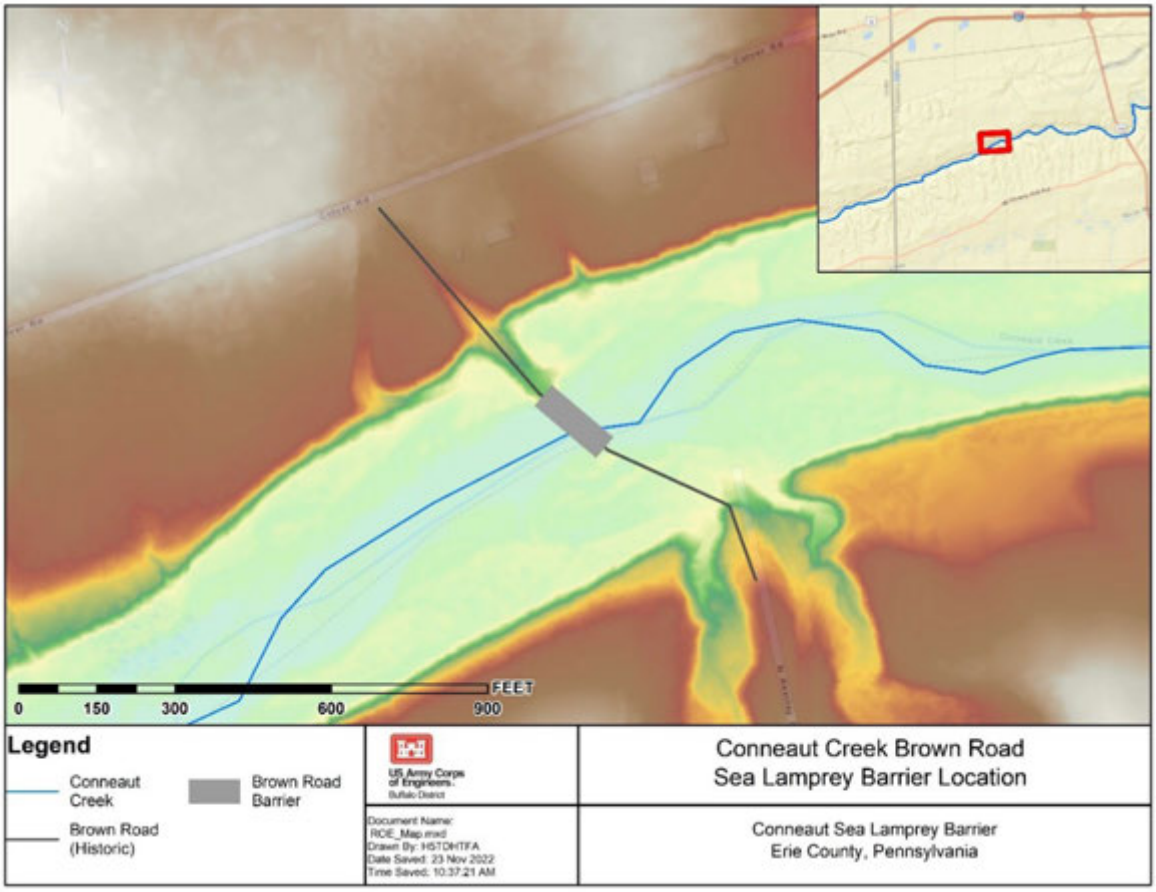


Figure 18: Brown Road Sea Lamprey Barrier Location.

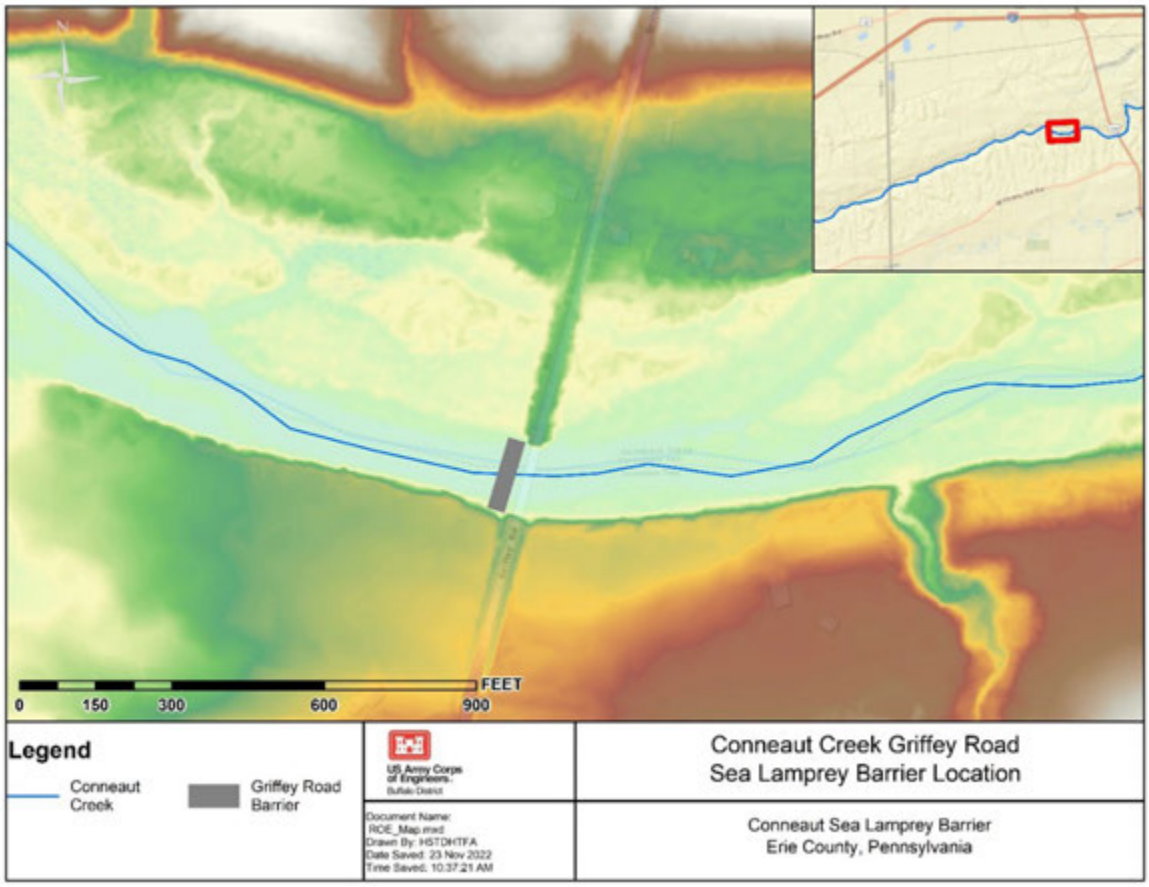


Figure 19: Griffey Road Sea Lamprey Barrier Location.

3.5.1 Site Evaluation

The following criteria were used to evaluate the suitability of each potential barrier location:

- Length of creek protected – Conneaut Creek will still need chemical treatment for sea lamprey post barrier implementation. However, this treatment will occur downstream of the barrier. The further downstream the barrier is located, the less stream miles requiring chemical treatment and more stream miles upstream protected by the barrier. Therefore, site locations further downstream are preferred over sites upstream.

- Structure height required – The crest height required for a barrier is dependent upon the geomorphology of the location. Locations that minimize barrier height and therefore minimize the baseflow inundation are more preferrable for a barrier.

- Upstream inundation distance and area – The number of stream miles and acreage of adjacent land to be inundated by construction of a barrier at each site was considered. Barrier locations that impact fewer stream miles and lower acreages of adjacent land are preferred.

- Number of parcels impacted by the inundation – Similar to the inundation, the number of parcels impacted by construction of a barrier at each site were considered. Barrier locations that impact fewer parcels, both at baseflow and during flood conditions, are preferred.

- Real estate and accessibility - The access to barrier locations is an important consideration for construction, real estate implications, operation and maintenance, etc. For these reasons, barrier locations were primarily identified at bridges and roadways. Preferred locations are easily accessible from public roadways and have the least number of impacts to private property.

To assess each site based on these criteria, a one-dimensional hydraulic model of Conneaut Creek using the USACE Hydrologic Engineering Center's River Analysis System (HEC-RAS) was developed (Appendix A-2). The HEC-RAS model was used to evaluate the two proposed barrier locations by modeling various annual chance exceedance events under existing and with project conditions. The two locations and barrier alternatives were analyzed based on the criteria listed above.

At both barrier locations (Brown and Griffey Road), seven barrier elevations were modeled for the low crest barriers (fixed or adjustable): the 2, 5, 10, 25 percent exceedance plus 18-inch barrier elevations and the 99% (1-year), 67% (1.5-year), and 50% (2-year) ACE plus 18 inches barrier elevations. The electric only barrier was also modeled at both Griffey and Brown Road sites. For each of the seven barrier elevations, a range of flows from the 95 percent to 2 percent exceedance flows and the 99% to the 0.2% ACE flows was modeled. The 95 percent exceedance flow of 7 cfs was considered baseflow conditions in Conneaut Creek. All seven barrier elevations at each site were compared to existing conditions for all modeled flows. For full details, refer to Appendix A-2.

To analyze each site against the barrier criteria, three barrier design scenarios were chosen: the 67% (1.5-year) ACE plus 18 inches (high scenario), the 5 percent exceedance plus 18 inch (medium scenario), and the 25 percent exceedance plus 18 inch (low scenario). Table 7 summarizes the barrier heights and inundation impacts for both the Griffey Road and Brown Road sites for the three barrier design scenarios. As expected, the lower barrier heights have lower levels of upstream inundation. Generally, the levels of inundation were similar at both sites for the "high" and "medium" design scenarios; however, the "low" differed substantially with inundation of 5.2 acres extending 1.06 miles upstream for Brown Road and 3.8 acres extending 0.37 miles upstream for Griffey Road.

Table 7: Griffey and Brown Road Low Fixed-Crest/Obermeyer Adjustable Low Crest Barrier Design Scenario Impacts.

Site	**Brown Road**			**Griffey Road**		
Design Scenario	*High*	*Medium*	*Low*	*High*	*Medium*	*Low*
Length of Creek Protected	~50 miles			~50 miles		
Structure Height Required	9.5 feet	6.5 feet	4.5 feet	9.7 feet	7.0 feet	5.0 feet
Upstream Inundation Distance and Area	18.6 acres 1.06 RM	9.6 acres 1.06 RM	5.2 acres 1.06 RM	22.5 acres 1.01 RM	10.8 acres 0.81 RM	3.8 acres 0.37 RM
Number of Parcels Impacted	11	11	11	16	12	7
Real Estate and Accessibility	Moderate			High		
High design scenario = 67% (1.5-yr) ACE +18" *Medium design scenario = 5% Exceedance + 18"* *Low design scenario = 25% Exceedance + 18"*						

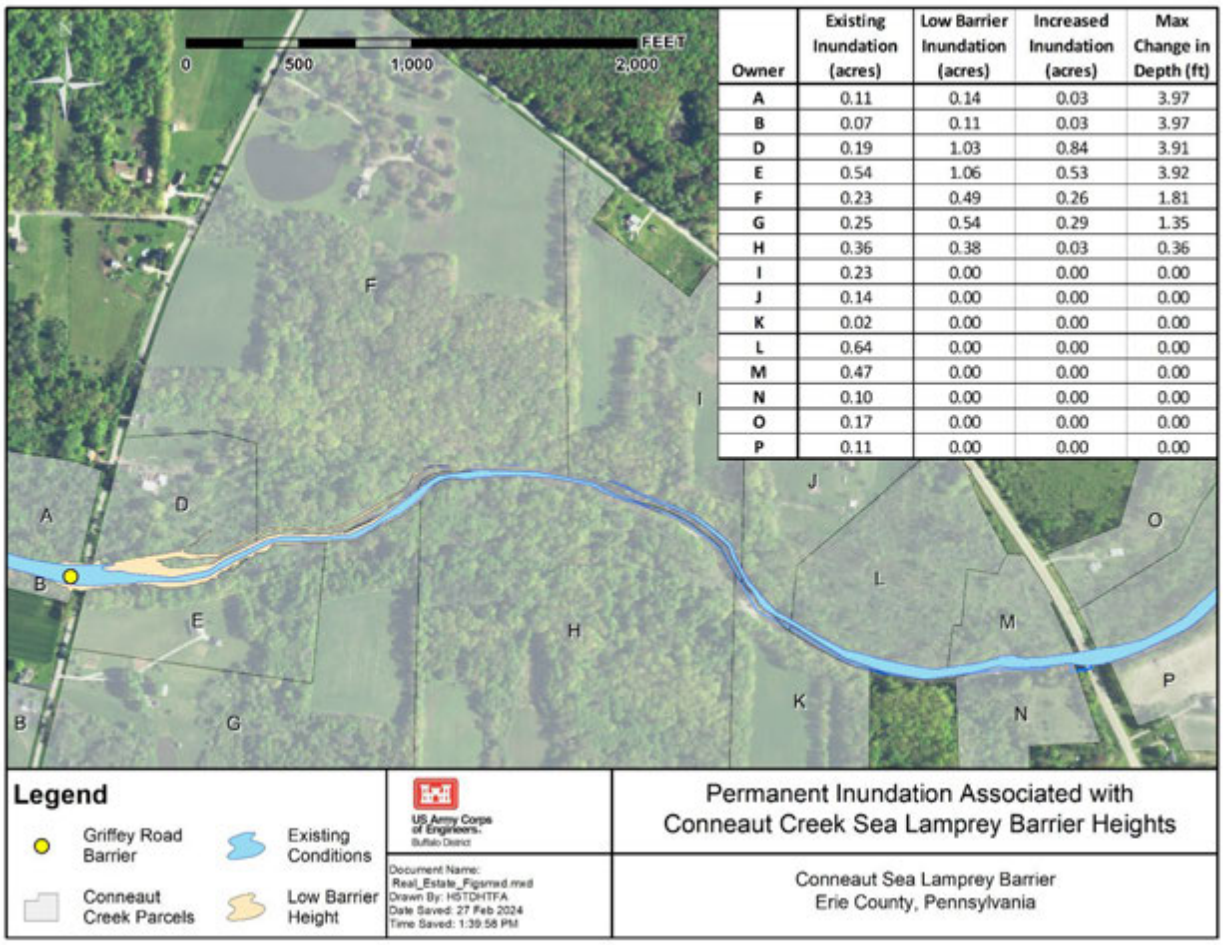
Electric Only Barrier

The electric only barriers at Brown and Griffey Road were also analyzed against the barrier criteria. This barrier was modeled as a flat sill across Conneaut Creek slightly above the channel invert elevation. Since main channel conveyance is maintained with this barrier, minimal impacts to water surface elevations upstream are incurred for all flow conditions modeled.

3.6 Recommended Site

Further evaluation identified the 25 percent exceedance + 18-inch design scenario at the Griffey Road site as the most suitable location for a barrier, representing the site that minimizes structure height, level of upstream inundation, and properties impacted by inundation, while maximizing the length of creek protected. Additional advantages to Griffey Road location include: PAFBC owns the parcel directly downstream of the bridge on the right of bank and has indicated a barrier on this land is potentially acceptable; property owners on the left of bank have been supportive of the study and potential implementation of a barrier at this location; and, the Pennsylvania Department of Transportation (PADOT) owns the land under the Griffey Road bridge and preliminary conversations indicate that they do not see any red flags that would prevent implementation of a barrier adjacent to or incorporated into the bridge structure. Based on input received during public meetings held in May and November 2022 (Refer to Appendix A-6), three key property owners in the vicinity of the Brown Road site do not support the project and have indicated that they will not support the use of their land for implementation of a barrier.

Each parcel impacted at the Griffey Road site was analyzed to determine the increases in inundation (acres) and WSE (feet) and percent increases from implementation of the different barrier heights modeled (Refer to Appendix A-2). Considering this inundation analysis, the 25 percent exceedance + 18-inch design scenario at Griffey Road appears to minimize upstream impacts and represents the most acceptable low crest barrier height from a property owner/real estate perspective (Figure 20).



Owner	Existing Inundation (acres)	Low Barrier Inundation (acres)	Increased Inundation (acres)	Max Change in Depth (ft)
A	0.11	0.14	0.03	3.97
B	0.07	0.11	0.03	3.97
D	0.19	1.03	0.84	3.91
E	0.54	1.06	0.53	3.92
F	0.23	0.49	0.26	1.81
G	0.25	0.54	0.29	1.35
H	0.36	0.38	0.03	0.36
I	0.23	0.00	0.00	0.00
J	0.14	0.00	0.00	0.00
K	0.02	0.00	0.00	0.00
L	0.64	0.00	0.00	0.00
M	0.47	0.00	0.00	0.00
N	0.10	0.00	0.00	0.00
O	0.17	0.00	0.00	0.00
P	0.11	0.00	0.00	0.00

Figure 20: Permanent/seasonal (baseflow) inundation associated with a low crest barrier for the low design scenarios at Griffey Road.

To date, two in-person public meetings have been held to inform the public on the progress of the feasibility study. The first occurred on May 24, 2022, at the Northwestern High School, Albion, PA, close to the potential barrier locations. USACE, PAFBC, USFWS, PADEP, GLFC, PA SeaGrant, and ODNR shared information on the importance of maintaining effective sea lamprey control in Conneaut Creek, ecology and management of Conneaut Creek, and potential sea lamprey barrier technologies that could be employed at Conneaut Creek. The second public meeting occurred on November 9, 2022, at the same location with the same supporting agencies. The target audience for this meeting was property owners along the Conneaut Creek whose properties would experience increased inundation as a result of a barrier being implemented at Brown Road or Griffey Road. Detailed information was presented on the array of barrier alternatives being considered and the associated inundation that would be experienced at each property. Refer to Appendix A-6 for the materials provided at each meeting.

Based upon this analysis, Griffey Road was identified as the most suitable location for a barrier representing the site that minimizes structure height and width, level of upstream inundation, and properties impacted by inundation, while maximizing the length of creek protected. Alternatives plans were evaluated for only the Griffey Road site.

3.7 Plan Evaluation

Each alternative plan in the focused array is evaluated in the following sections by projecting and comparing the with-project and without-project conditions. The projection of these conditions includes habitat assessments, incremental cost analyses, and ability to meet planning criteria.

3.7.1 Ecological Analysis

To calculate the ecological uplift derived from each alternative plan, aquatic resources within the Project Area were delineated. Then the initial quality of the affected environment was assessed using the Ohio Environmental Protection Agency (OEPA) Ohio Rapid Assessment Methodology (ORAM) for wetlands (Mack, 2001) or the United States Environmental Protection Agency (USEPA) Rapid Bioassessment Protocol (RBP) – Habitat Assessment for streams (Barbour et al., 1999).

The ORAM is a rapid assessment of wetland quality comprised of a narrative rating and quantitative rating. The narrative rating portion directs the assessor through a series of questions to determine if the wetland is likely of poor quality (Category 1) or high quality (Category 3). The narrative rating utilizes known information sources, like threatened and endangered species databases. Conclusions derived from the narrative rating should be verified by completing the quantitative rating. The quantitative rating considers six metrics: size, upland buffers and surrounding land use, hydrology, habitat alteration and development, special wetland communities, and vegetation, interspersion, and microtopography. Metrics may include submetrics to assess wetland characteristics in more detail and calculate a more accurate score. To calculate the ORAM score, the assessor reviews wetland conditions, selects the appropriate score for each submetric, and calculates the total for each metric. The ORAM is based on a 100-point score, and wetlands are grouped into three categories based on quality. Category 1 wetlands (scores of 0-29.9) are considered lowest quality, while Category 3 wetlands (scores of 65-100) are considered highest quality. Wetlands delineated within the Project Area were assessed using the ORAM methodology and assigned a score of 84, meaning wetlands likely to be impacted by alternatives are Category 3. Additional information regarding wetland delineation and assessment is provided in Appendix A-6.

The USEPA RBP – Habitat Assessment is a rapid assessment of instream and riparian habitat, which influences the aquatic community. The USEPA RBP – Habitat Assessment includes a general description and physical characterization of the site, water quality assessment, and visual assessment of habitat quality. Data collected as part of the physical characterization and water quality assessment includes land use, stream origin, stream type, channel width, channel depth, flow, substrate, water quality (e.g., temperature, dissolved oxygen (DO), turbidity, etc.), riparian buffer width, riparian vegetation, presence of dams or large woody debris, and aquatic vegetation. The visual assessment of habitat quality uses different parameters for high-gradient and low-gradient streams to account for differences in habitat and substrate between the two types of streams. The visual assessment includes evaluation of the epifaunal substrate or available cover, embeddedness (high-gradient) or pool substrate characterization (low-gradient), velocity/depth combinations (high-gradient) or pool variability (low-gradient), sediment deposition, channel flow status, channel alteration, frequency of riffles or bends (high-gradient) or channel sinuosity (low-gradient), bank stability, bank vegetative protection, and riparian vegetative zone width. Each parameter is assigned a score between 0-20, with higher scores corresponding to higher quality habitat. The scores for each parameter are summed and compared against a reference condition to determine the final habitat ranking. Conneaut Creek within the Project Area was assessed using the US EPA RBP – Habitat Assessment methodology and assigned a score of 169, meaning the habitat quality in

the affected stream reach is considered optimal. Additional information regarding stream assessment is provided in Appendix A-6.

Calculation of ecological outputs needed to consider both the habitat area protected by the barrier as well as the area of habitat adversely impacted by each type of barrier in accordance with the equation below.

$$HU_{Total} = HU_{Protected} - HU_{Impacted}$$

$$HU_{Protected} = A_{Protected} \times Be$$

$$HU_{Impacted} = A_{Impacted} \times \mu(\Delta_{WQ}, \Delta_{SQ}, \Delta_{SSR})$$

Where:

HU = Habitat Units. $HU_{Protected}$ represents the habitat units protected from sea lamprey invasion by each alternative, while $HU_{Impacted}$ represents the habitat units impacted by barrier construction. HU_{Total} represents the overall ecological output obtained from each alternative.

A = Area. The area protected by each alternative ($A_{Protected}$) is considered the area that sea lamprey will be blocked from accessing, which is estimated as 371 acres for the No Action alternative and 513 acres for Alternatives 1, 2, 3, and 4. The difference in the area protected between the No Action alternative and Alternatives 1-4 assumes that under the continued use of lampricide (No Action alternative) the area upstream of Bessemer Dam is not protected from sea lamprey invasion and will need to be treated at some point in the future. The Action alternatives provide additional protection from sea lamprey invading the 142 acres of suitable sea lamprey habitat that exists upstream of Bessemer Dam. The area impacted by each alternative ($A_{Impacted}$) is held constant at 371 acres for a fair comparison between with and without project conditions. The $A_{Impacted}$ includes stream and wetland habitats that will be impacted by construction of the barrier and resulting upstream inundation, as well as the area that may experience impacts resulting from decreased biological connectivity between upstream and downstream habitats. The area of stream and wetland impacts for each alternative (Table 9 & Table 10) were developed based upon conceptual designs and associated inundation maps.

Be = Barrier Effectiveness. The effectiveness of each barrier type, including lampricide treatment for the future without-project condition, is an estimate of the percentage of sea lamprey blocked by the barrier. Barrier effectiveness values were determined through discussions with the USFWS drawing upon their knowledge and experience of different sea lamprey barriers and their associated effectiveness. Values for barrier effectiveness ranged from 0.75 (Alternative 2) to 0.99 (Alternative 1) (Table 8).

Table 8: Estimates of barrier effectiveness for each alternative.

Alternative	Barrier Effectiveness
No Action - continued lampricide treatment	0.90
1 - Fixed Crest (High), Trap & Sort, Denil	0.99
2 - Electric, Trap & Sort	0.75
3a - Fixed Crest (Low), Electric, Trap & Sort, Slotted Fishway, Jumping Pool	0.95
4a - Adjustable Crest (Low - Obermeyer), Electric, Trap and Sort, Jumping Pool	0.95

WQ = Wetland Quality. Changes in wetland quality associated with each alternative were estimated based on best professional judgement and wetland characteristics identified in the ORAM method. The change in wetland quality from existing conditions to future with-project conditions was calculated for each alternative and multiplied by the acreage of wetland habitat expected to be impacted as a result of increased inundation to calculate the number of wetland habitat units impacted. Values for wetland habitat units impacted were normalized across all alternatives (Table 9).

Table 9: Wetland habitat units impacted by each alternative.

Alternative	Wetland Area Impacted (ac)	Wetland Quality Existing	Wetland Quality With Project	Δ Wetland Quality	Wetland HU Impacted	Normalized Wetland HU Impacted
No Action - continued lampricide treatment	0.00	0.84	0.84	0.00	0.00	0.00
1 - Fixed Crest (High), Trap & Sort, Denil	22.90	0.84	0.00	0.84	19.24	1.00
2 - Electric, Trap & Sort	0.00	0.84	0.84	0.00	0.00	0.00
3a - Fixed Crest (Low), Electric, Trap & Sort, Slotted Fishway, Jumping Pool	1.01	0.84	0.00	0.84	0.85	0.04
4a - Adjustable Crest (Low - Obermeyer), Electric, Trap and Sort, Jumping Pool	1.01	0.84	0.60	0.24	0.24	0.01

SQ = Stream Quality. Changes in stream quality associated with each alternative were estimated based on best professional judgement and stream characteristics identified in the USEPA RBP – Habitat Assessment method. The change in stream quality from existing conditions to future with-project conditions was calculated for each alternative and multiplied by the acreage of stream habitat that is expected to change hydraulic regime from flowing to an impoundment. Also included in this acreage is the direct project footprint. Values for stream habitat units impacted were normalized across all alternatives (Table 10).

Table 10: Stream habitat units impacted by each alternative.

Alternative	Stream Area Impacted (ac)	Stream Quality Existing	Stream Quality With Project	Δ Stream Quality	Stream HU Impacted	Normalized Stream HU Impacted
No Action - continued lampricide treatment	0.00	0.85	0.85	0.00	0.00	0.00
1 - Fixed Crest (High), Trap & Sort, Denil	26.60	0.85	0.61	0.24	6.38	1.00
2 - Electric, Trap & Sort	0.00	0.85	0.85	0.00	0.00	0.00
3a - Fixed Crest (Low), Electric, Trap & Sort, Slotted Fishway, Jumping Pool	2.66	0.85	0.61	0.24	0.64	0.10
4a - Adjustable Crest (Low - Obermeyer), Electric, Trap and Sort, Jumping Pool	2.66	0.85	0.73	0.12	0.32	0.05

SSR = Sensitive Species Risk. To capture impacts directly to the sensitive biotic communities within the stream, the risk of negative impacts to fish, amphibians, mussels, and aquatic insects were estimated on a scale of 0 (no risk) to 1.00 (high risk) based on best professional judgment. These biotic groups were selected due to their documented sensitivity to lampricide treatments (Grunder et al, 2021, Wilkie et al.

2019) and changes in stream hydrology and hydraulics. It is well understood that artificial obstructions (i.e., dams) in a stream can block fish and other aquatic organisms from moving along their natural pathways, causing interruptions in the life cycles and limiting their ability to reproduce. The following considerations were made while scoring the sensitive species groups for each alternative:

- Size and type of barrier and the expected changes in stream hydrology and hydraulics.
- General life history and habitat use associated with each sensitive species group and how a change in stream hydrology and hydraulics may affect the quantity and quality of available habitat.
- General life history and habitat use associated with each sensitive species group and how a change in habitat and/or biologic connectivity may affect the quantity and quality of available habitat.
- The anticipated effectiveness of fish passage measures associated with each alternative.

Sensitive species risk was averaged across all four biotic categories considered (i.e., fish, mussels, amphibians, aquatic insects) to obtain one sensitive species risk factor for each alternative (Table 11). Alternative 1 (Fixed Crest – High, Trap & Sort, Denil) presents the highest risk to sensitive species included in this assessment with a score of 0.59. This is mainly due to the large area and distance of upstream inundation that would result from construction of an approximately 16 foot fixed crest barrier (refer to Table 7). This permanent change in hydrology and hydraulics of the instream habitat is certainly expected to have negative effects on the biologic connectivity of fish, amphibians, mussel, and to a lesser extent aquatic insects. Additionally, while the fish passage measures (trap & sort, denil) would help to reduce the disruption to biological/habitat connectivity, it is expected to be less effective relative to the other alternatives. In contrast, Alternative 4a (Adjustable Crest (Low - Obermeyer), Electric, Trap and Sort, Jumping Pool) presents one of the lowest risks to sensitive species with a score of 0.21. This is mainly due to the low crest height, minimal associated upstream inundation, and seasonal operation of the barrier which will restore natural stream hydrology and hydraulics for approximately half of the year allowing unimpeded movement of aquatic organisms within Conneaut Creek.

Table 11: Sensitive Species Risk Assessment for each alternative.

Alternative	Fish	Amphibians	Mussels	Aquatic Insects	Sensitive Species Risk
No Action - continued lampricide treatment	0.17	0.67	0.17	0.33	0.34
1 - Fixed Crest (High), Trap & Sort, Denil	0.67	0.67	0.67	0.33	0.59
2 - Electric, Trap & Sort	0.50	0.00	0.33	0.00	0.21
3a - Fixed Crest (Low), Electric, Trap & Sort, Slotted Fishway, Jumping Pool	0.50	0.33	0.33	0.17	0.33
4a - Adjustable Crest (Low - Obermeyer), Electric, Trap and Sort, Jumping Pool	0.33	0.17	0.17	0.17	0.21

* Sensitive Species Risk Scoring Scale: 0 = No Risk; 0.33 = Low; 0.67 = Medium; 1.0 = High

The resulting habitat units calculated for each alternative were compared against the future without-project condition to calculate the average annual habitat units (AAHU) obtained from each alternative

(Table 12). For illustrative purposes below are the calculations for Alternative 4a. Similar calculations were completed for each alternative:

$$HU_{Total} = HU_{Protected} - HU_{Impacted}$$

$$HU_{Total} = (A_{Protected} \times Be) - (A_{Impacted} \times \mu(\Delta_{WQ}, \Delta_{SQ}, \Delta_{SSR}))$$

$$\text{Alt 4a } HU_{Total} = (513\ acres\ x\ 0.95) - (371\ acres \times \mu(0.01, 0.05, 0.21))$$

$$\text{Alt 4a } HU_{Total} = 487.3 - 33.4 = 453.9$$

Habitat units represent the quality of habitat provided by an area over the course of one year. In order to calculate the Average Annual Habitat Units (AAHU) throughout the 50 year life of the project, it was assumed that after construction of the project in year one, the benefits for each action alternative (1-4a) will be fully realized. The without-project scenario or "No Action" alternative assumes that the existing condition will be maintained into the future at 292.5 habitat units per year. Lastly, the change in AAHU (Δ AAHU) is calculated by taking the difference between the with and without project AAHU's. For illustrative purposes the AAHU calculation for Alternative 4a is presented below:

$$\text{Alt 4a AAHU} = (HU_{YR1} + HU_{YR2} + HU_{YR3} \ldots HU_{YR50})/50$$

$$\text{Alt 4a AAHU} = (292.5 + 453.9 + 453.9 \ldots 453.9)/50 = 452.4$$

$$\text{Alt 4a } \Delta \text{ AAHU} = 452.4 - 292.5 = 159.9$$

Based on this analysis, Alternative 1 did not result in net ecological benefit, whereas Alternative 4a provided the greatest amount of ecological uplift with a Δ AAHU of 160. In the event that the Bessemer Dam is not compromised within the period of analysis, the ecological benefits were recalculated using 371 acres for the $HU_{Protected}$ of the with-project alternatives. Under this future scenario, Alternative 4a still provides that greatest amount of ecological uplift when compared to the other alternatives including the "No Action".

Table 12: Ecological outputs associated with each alternative. HU = Habitat Units. AAHU = Average Annual Habitat Units.

Alternatives	$HU_{Protected}$	$HU_{Impacted}$	HU_{Total}	AAHU	Δ AAHU
No Action – Continued lampricide treatment	333.9	41.4	292.5	292.5	0.0
1 – Fixed crest (High), Trap & Sort, Denil	507.9	319.7	188.2	189.2	-103.2
2 – Electric, Trap & Sort	384.8	25.7	359.1	358.4	65.9
3a – Fixed Crest (Low), Electric, Trap & Sort, Slotted Fishway, Jumping Pool	487.4	58.8	428.6	427.5	135.0
4a – Adjustable Crest (Low – Obermeyer), Electric, Trap & Sort, Jumping Pool	487.4	33.4	454.0	452.4	160.0

3.7.2 Cost Effectiveness/Incremental Cost Analysis

Because ecosystem restoration projects rely on nonmonetary benefits, traditional cost benefit analysis is not feasible. Rather, alternative plans are evaluated using cost effectiveness and incremental cost

analyses (CE/ICA) to determine if the ecological benefits provided by the alternative are cost effective when compared to other alternatives. The Institute for Water Resources (IWR) Planning Suite Software is used to perform the CE/ICA.

To perform the CE/ICA, a cost effectiveness analysis must be conducted first. In ecosystem restoration studies, cost effective plans are considered those plans for which the output (i.e., average annual habitat units) cannot be produced at less cost by another alternative. In other words, for a given level of ecological output, no other plan cost less, and no other plan yields more output for less money.

Incremental cost analysis requires evaluation of the cost-effective plans to identify the greatest amount of output that can be generated within the non-federal sponsor and USACE's capabilities. Cost effective plans are compared through sequential increases in the scale and increment of output to determine which plans are most efficient in producing environmental benefits. The most efficient plans are considered "Best Buys." Best Buy plans provide the greatest increase in output for the lowest increase in cost, with the lowest incremental costs per unit of output.

The CE/ICA was used to evaluate alternatives in terms of incremental average annual cost per average annual habitat unit over the 50-year period of analysis (2027-2076) and the 2023 interest rate of 2.5 percent, based on Economic Guidance Memorandum (EGM) 23-01. The IWR Planning Suite Tool was run based on construction costs, average annual costs (AAC) (Appendix A-9), and ecological outputs (i.e., average annual habitat units) for each alternative (Figure 21, Table 13). Based on these results, Alternative 1 is not cost-effective. Alternatives 2 and 3 are cost effective, but not best buy plans, and Alternative 4 is the best buy plan.

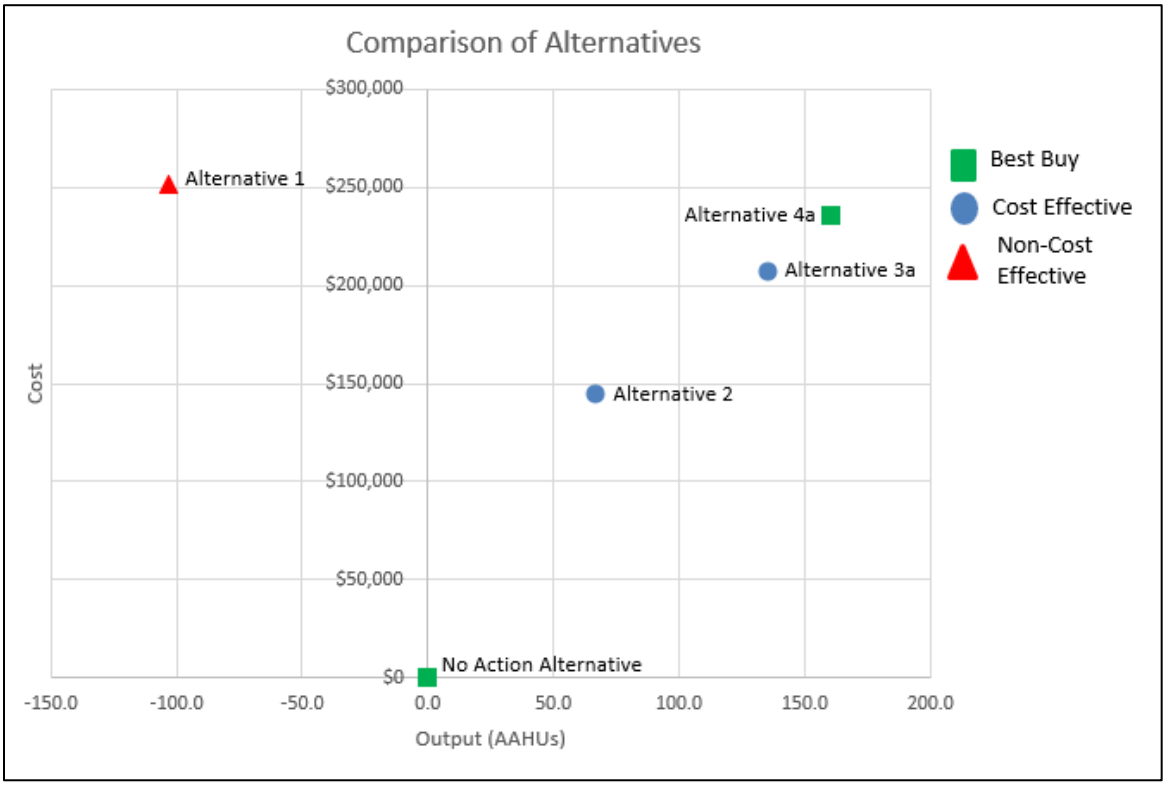


Figure 21: Results of cost effectiveness analysis. AAHUs = Δ Average Annual Habitat Units. Cost shown as Average Annual Cost (AAC).

Table 13. Results of cost effectiveness / incremental cost analysis (CE/ICA). ROM = Rough Order of Magnitude construction cost; AAC = Average Annual Cost; Δ AAHU = Average Annual Habitat Units.

Alternatives	ROM Cost	AAC	Δ AAHU	Cost/Output	Cost Effective
No Action – Continued lampricide treatment	-	-	-	-	-
1 – Fixed crest (High), Trap & Sort, Denil	$6,484,300	$228,862	-103.2	-	No
2 – Electric, Trap & Sort	$3,740,867	$132,033	66.0	$1,902	Yes
3a – Fixed Crest (Low), Electric, Trap & Sort, Slotted Fishway, Jumping Pool	$5,332,427	$188,207	135.0	$1,325	Yes
4a – Adjustable Crest (Low – Obermeyer), Electric, Trap & Sort, Jumping Pool	$6,076,071	$214,454	160.0	$1,274	Yes (Best Buy)

3.7.3 Federal Objective

The P&G state that the federal objective of water and related land resources planning is to contribute to national economic development (NED) consistent with protecting the environment, in accordance with national environmental statutes, applicable executive orders, and other federal planning objectives. Contributions to NED are increases in the net value of the national output of goods and services, expressed in monetary units, and are the direct net benefits that accrue in the study area.

For ecosystem restoration projects, plans must be formulated to contribute to national ecosystem restoration (NER). Contributions to NER are increases in the net quantity and/or quality of desired ecosystem resources. Contributions to NER are measured based on changes in ecological resource quality and/or quantity and expressed quantitatively in physical units or indexes rather than monetary units.

3.7.4 Contribution to Objectives and Avoidance of Constraints

Three objectives were identified for this study: effectively prevent or significantly reduce the numbers of sea lamprey reaching spawning habitat in Conneaut Creek, reduce the need to use lampricide in Conneaut Creek, and maintain or improve the stream habitat quality for desirable fish species. During preliminary screening of alternatives, alternatives that did not meet these objectives were eliminated from further consideration. The final array of alternatives was ranked based on their ability to meet each study objective (Table 14). Alternative 1 was considered most effective in blocking sea lamprey migration and reducing lampricide use but also most detrimental to existing habitat quality. The No Action alternative would result in fewest impacts to in-stream habitat quality but would not alter sea lamprey migration patterns.

Table 14: Ranking of alternatives based on ability to meet each of the three study objectives.

Alternatives	Objectives		
	Block sea lamprey migration	***Reduce lampricide use***	***Maintain habitat quality***
No Action – Continued lampricide treatment	**5** – Sea lamprey migration will continue unimpeded	**5** – Sea lamprey migration will continue unimpeded; lampricide may be required	**1** – No change to in-stream habitat quality anticipated
1 – Fixed crest (High), Trap & Sort, Denil	**1** – Extremely effective in blocking sea lamprey migration under all modeled flow conditions	**1** – Likely to eliminate need for lampricide upstream of barrier	**5** – Results in highest acreage of permanent inundation and permanent change in habitat connectivity and type
2 – Electric, Trap & Sort	**4** – Electrical current may not be effective during high flow	**4** – Sea lamprey migration may continue during high flow and lampricide may be required	**2 –** No permanent change in ecological connectivity but altered behavior required to avoid electrical current
3a – Fixed Crest (Low), Electric, Trap & Sort, Slotted Fishway, Jumping Pool	**2** – Very effective in blocking sea lamprey migration under modeled flow conditions	**2** – Likely to eliminate, or significantly reduce, need for lampricide upstream of barrier	**4** – Results in permanent inundation and permanent change in habitat connectivity and type
4a – Adjustable Crest (Low – Obermeyer), Electric, Trap & Sort, Jumping Pool	**2** – Very effective in blocking sea lamprey migration, if properly operated and maintained	**2** – Likely to eliminate, or significantly reduce, need for lampricide upstream of barrier	**3** – Results in seasonal inundation and disruption of habitat connectivity

Plan evaluation also considers the ability of the alternatives to avoid constraints. Five constraints were identified for this study, including: limit impacts to native fish and mussel populations, minimize impacts to public safety, minimize upstream area of inundation, limit federal project expenditure to $10,000,000, and satisfy all applicable environmental requirements. Each alternative plan can be implemented within the federal participation limit for GLFER projects and, therefore, alternatives were not ranked based on this constraint. Alternatives were ranked on the extent to which they violate the remaining constraints (Table 15). Each alternative violates at least one constraint, but mitigation measures will be incorporated into each plan to minimize impacts to native species and public safety to an acceptable level.

Table 15: Ranking of alternatives based on ability to avoid planning constraints.

Alternatives	Constraints			
	Limit impacts to native species	*Minimize impacts to public safety*	*Minimize upstream area of inundation*	*Satisfy environmental requirements*
No Action – Continued lampricide treatment	**4 –** Lampricide use may impact native species	**1** – No change in public safety	**1 –** No change in inundation	1 – No applicable environmental requirements
1 – Fixed crest (High), Trap & Sort, Denil	**5** – Significant ecological impact due to connectivity and sediment transport disruption and size of barrier	**2** – No electrical current in the water reduces public safety concern	**5** – Results in highest acreage of permanent inundation	**5** – Size of barrier proposed may not be acceptable to resource agencies
2 – Electric, Trap & Sort	**1** – Electrical current will not result in permanent impacts to native species passage	**5** – Electrical current presents public safety risk	**1 –** No change in inundation	**2** – Potentially acceptable to resource agencies
3a – Fixed Crest (Low), Electric, Trap & Sort, Slotted Fishway, Jumping Pool	**3** – Some disruption to habitat connectivity under low and normal flow events	**5** – Electrical current presents public safety risk	**4** – Results in permanent inundation	**4** – Permanent barrier may be acceptable to resource agencies
4a – Adjustable Crest (Low – Obermeyer), Electric, Trap & Sort, Jumping Pool	**2** – Some seasonal disruption to habitat connectivity	**5** – Electrical current presents public safety risk	**3** – Results in seasonal inundation	**3** – Seasonal barrier may be acceptable to resource agencies

3.7.5 System of Accounts

The P&G establishes four accounts for use in alternative plan evaluation. These four accounts include NED, regional economic development (RED), environmental quality (EQ), and other social effects (OSE). Consideration of these four accounts ensures that all potential effects of alternative plans are identified. Additionally, the Policy Directive titled "Comprehensive Documentation of Benefits in Decision Document," dated 5 January 2021, directs USACE to provide comprehensive documentation of the total benefits of each alternative and to consider all four accounts equally in plan evaluation.

National Economic Development (NED)

The NED account displays changes in the economic value of the national output of goods and services, including ecosystem restoration. Construction of a barrier to prevent sea lamprey migration will reduce, or eliminate, the need for lampricide treatments. Under the without-project conditions, the USFWS will continue to conduct lampricide treatments every 2-5 years at a cost of $192,000 per treatment. Additionally given the current state of the Bessemer Dam, and the USFWS may need to conduct lampricide treatments in the East Branch within 20 years for an additional $85,000 per treatment. Under the with-project conditions, the lampricide treatments in Conneaut Creek will no longer be necessary, resulting in an average savings of $59,100. However, it is expected that the recommended plan will require annual operations and maintenance and the cost associated with these activities will likely cancel these cost savings.

Regional Economic Development (RED)

The USACE Regional Economic System (RECONS) model was used to conduct the Regional Economic Development (RED) evaluation for the focused array of alternatives. RECONS is a USACE-certified regional economic model designed to provide accurate and defensible estimates of regional economic impacts and contributions associated with USACE projects, programs, and infrastructure. Regional economic impacts and contributions are measured as economic output (sales), jobs, income, and value added. Estimates are provided simultaneously for three levels of geographic impact area: local, state, and national.

Table 16 and Table 17 display key terms and definitions to assist with interpreting the results of this RED evaluation.

Table 16: Overview of Economic Impact Metrics

Output (sales)	Annual sales are equivalent to annual economic output or the value of production by industry. Output can be measured either by total value of purchases by intermediate and final consumers or by intermediate outlays plus value added.
Jobs	A job is the annual average of monthly jobs in an industry (this is the same definition used by Quarterly Census of Employment and Wages, Bureau of Labor Statistics, and Bureau of Economic Analysis nationally). A job can be full-time, part-time or overtime, and includes proprietors (i.e., self-employed persons). Job estimates are presented in full-time equivalence.
Labor Income	Labor income represents all forms of annual employment earnings; it is the sum of employee compensation and proprietor income.
Value Added	Value added consists of employee compensation, proprietary income, other property type income (which includes industry profits), and indirect business taxes. Value-added is an estimate of the gross regional product (GRP).

Table 17: Overview of Economic Impacts

Direct Impacts	Direct impacts occur in the impact area in which a project or economic activity is located. Direct sales represent that proportion of the spending or sales in each industry that flows to material and service providers in the impact area. For employment, labor income, and GRP measures, the direct impacts represent the jobs, labor income, and gross regional product associated with the directly affected industry.
Indirect Impacts	The indirect impacts include the backward-linked industry suppliers for goods and services that support the directly affected industries, supporting indirect sales, jobs, labor income and value added. For example, if construction activity is the direct impact, indirect business supporting construction would include architectural and engineering, lumber suppliers, trucking, and steel manufacturers, among others; these are considered backward-linked industries supporting the construction activity.
Induced Impacts	Induced impacts occur from household expenditures or consumer spending associated with the direct and indirect workers spending their earnings within the impact area, supporting induced sales, jobs, labor income, and value added.
Total Impacts	Total impacts are the sum of direct, indirect, and induced impacts.

The RECONS module applied in this evaluation was the Civil Works Spending: All Work Activities, with Ability to Customize Impact Area and Work Activity, with the Construction Activities for Ecosystem and Habitat Restoration or Improvements work activity, and a local impact area of Erie County, Pennsylvania. Figure 22 shows the impact area of Erie County within the Commonwealth of Pennsylvania.

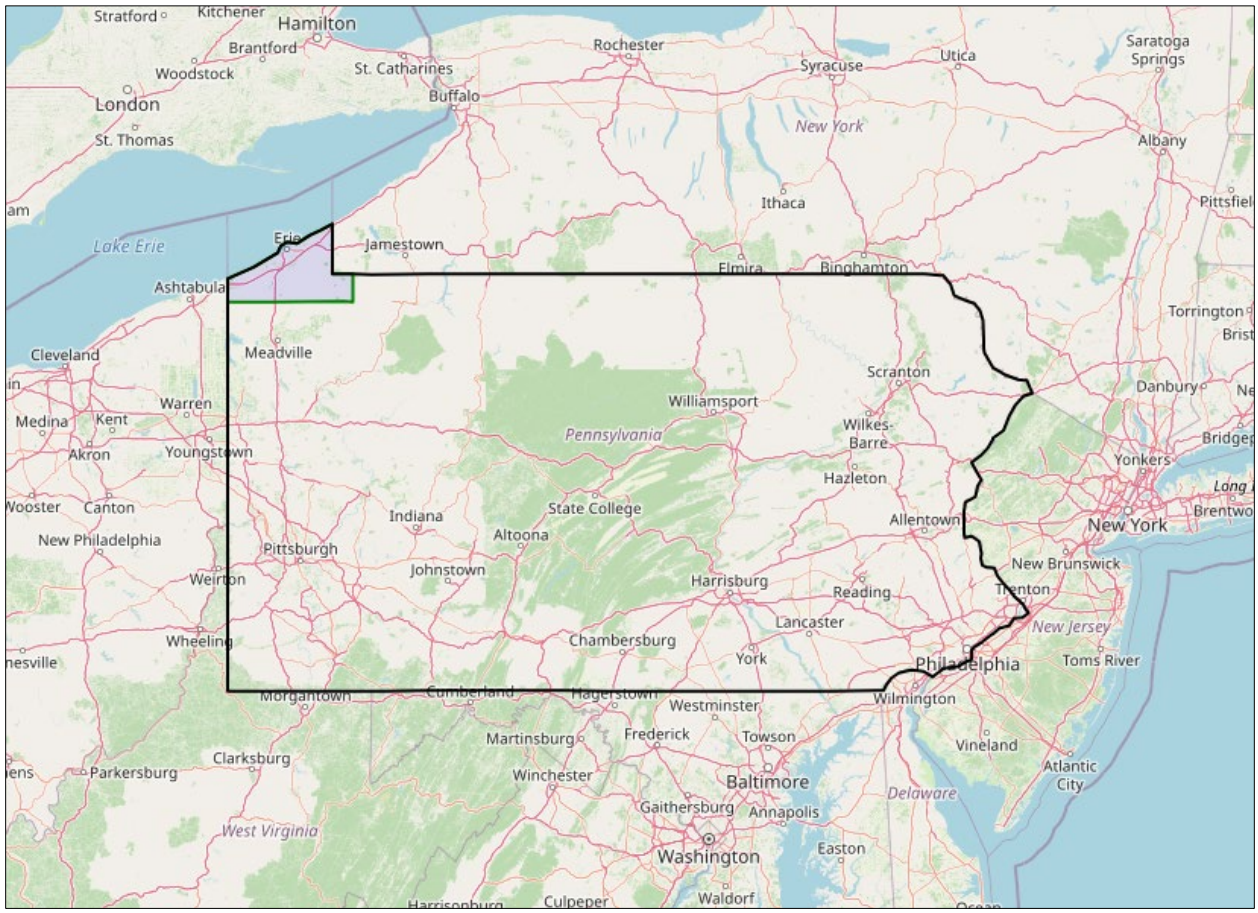


Figure 22: Regional Impact Area (Erie County, Pennsylvania).

The Civil Works Spending Modules are used to estimate the regional economic impacts and contributions of project expenditures within the eight USACE Civil Works business lines. Project expenditures include studies, construction, and operations and maintenance activities. The Civil Works Spending Modules allow the user to specify the project location and work activity (e.g., dredging, lock and dam construction, beach nourishment, etc.) to estimate the economic output, jobs, income, and value added for three levels of geography: local, state, and national impact areas.

Construction expenditures associated with the alternatives were entered into the model to generate output displayed in Table 18, Table 19, Table 20, and Table 21. Estimates of the economic activity presented in the tables are to be supported during the four-month construction period from June to October 2026. Economic impacts are estimated to accrue in proportion to spending in any given year. For example, if 20 percent of the construction expenditures occur in the first year of construction, it is estimated that 20 percent of the impacts would also be incurred in that same time period. Project expenditures and RED output are presented in FY23 dollars.

Table 18: RECONS Output for Alternative 1

Area Type	Economic Impact Metric			
	Output	Jobs[1]	Labor Income	Value Added
Local Area				
Direct Impact	$5,545,315	69.0	$3,928,683	$2,809,348
Indirect and Induced Impact	$4,455,517	29.5	$1,454,743	$2,421,821
Total Impact	$10,000,832	98.5	$5,383,426	$5,231,170
State				
Direct Impact	$6,338,662	84.6	$5,280,858	$3,718,776
Secondary Impact	$7,861,828	41.2	$2,725,280	$4,511,532
Total Impact	$14,200,490	125.8	$8,006,138	$8,230,309
U.S.				
Direct Impact	$6,481,087	87.9	$5,530,146	$3,898,493
Secondary Impact	$14,214,502	64.6	$4,413,574	$7,655,705
Total Impact	$20,695,589	152.5	$9,943,720	$11,554,198

[1] Full Time Equivalent Jobs.

Table 19: RECONS Output for Alternative 2

Area Type	Economic Impact Metric			
	Output	Jobs[1]	Labor Income	Value Added
Local Area				
Direct Impact	$3,199,156	39.8	$2,266,502	$1,620,745
Indirect and Induced Impact	$2,570,439	17.0	$839,258	$1,397,176
Total Impact	$5,769,595	56.8	$3,105,760	$3,017,922
State				
Direct Impact	$3,656,847	48.8	$3,046,587	$2,145,405
Secondary Impact	$4,535,579	23.8	$1,572,245	$2,602,755
Total Impact	$8,192,425	72.6	$4,618,833	$4,748,159
U.S.				
Direct Impact	$3,739,013	50.7	$3,190,405	$2,249,085
Secondary Impact	$8,200,509	37.3	$2,546,242	$4,416,664
Total Impact	$11,939,522	88.0	$5,736,646	$6,665,749

[1] Full Time Equivalent Jobs.

Table 20: RECONS Output for Alternative 3

Area Type	Economic Impact Metric			
	Output	Jobs[1]	Labor Income	Value Added
Local Area				
Direct Impact	$4,560,244	56.8	$3,230,790	$2,310,295
Indirect and Induced Impact	$3,664,038	24.2	$1,196,322	$1,991,608
Total Impact	$8,224,282	81.0	$4,427,113	$4,301,903
State				
Direct Impact	$5,212,660	69.6	$4,342,765	$3,058,172
Secondary Impact	$6,465,251	33.9	$2,241,160	$3,710,102
Total Impact	$11,677,911	103.4	$6,583,925	$6,768,274
U.S.				
Direct Impact	$5,329,785	72.3	$4,547,769	$3,205,963
Secondary Impact	$11,689,433	53.1	$3,629,546	$6,295,744
Total Impact	$17,019,218	125.4	$8,177,315	$9,501,707

[1] Full Time Equivalent Jobs.

Table 21: RECONS Output for Alternative 4

Area Type	Economic Impact Metric			
	Output	Jobs[1]	Labor Income	Value Added
Local Area				
Direct Impact	$5,196,201	64.7	$3,681,346	$2,632,482
Indirect and Induced Impact	$4,175,014	27.6	$1,363,158	$2,269,352
Total Impact	$9,371,215	92.3	$5,044,504	$4,901,833
State				
Direct Impact	$5,939,602	79.3	$4,948,393	$3,484,655
Secondary Impact	$7,366,875	38.6	$2,553,706	$4,227,502
Total Impact	$13,306,477	117.9	$7,502,099	$7,712,157
U.S.				
Direct Impact	$6,073,060	82.4	$5,181,987	$3,653,057
Secondary Impact	$13,319,606	60.5	$4,135,711	$7,173,729
Total Impact	$19,392,666	142.9	$9,317,698	$10,826,786

[1] Full Time Equivalent Jobs.

Environmental Quality (EQ)

The EQ account displays the non-monetary effects on significant natural and cultural resources. In accordance with USACE policy and guidance, ecosystem restoration projects must result in an overall ecological uplift, or net benefit. Based on the ecological benefits analysis (Section 3.7.1), which considered both temporary and permanent impacts on environmental resources, Alternative 1 results in net negative ecological benefit, meaning implementation of this alternative will result in environmental

degradation rather than uplift. Alternatives 2, 3, and 4 result in varying degrees of ecological uplift, with Alternative 4 providing the greatest number of average annual habitat units.

In addition to ecological uplift, the EQ account considers the effects of each alternative on environmental and cultural resources. There are no known impacts to cultural resources anticipated to result from implementation of any of the alternative plans, but minor temporary or permanent impacts to endangered bat species may occur through impacts to roosting habitat during construction and/or operation of the barrier. These impacts will be avoided or minimized, to the extent practicable, and coordinated with the USFWS, PFBC, PADEP, and PADCNR.

Plan formulation considered three major environmental implications of alternative implementation: reduced sea lamprey migration, altered habitat connectivity, and altered habitat type. Effective barriers will result in reduced sea lamprey migration, which in turn will benefit the aquatic ecosystem by reducing the number of fish parasitized by sea lamprey. Implementation of a sea lamprey barrier will alter habitat connectivity and fish passage through Conneaut Creek. Each alternative plan includes one or more measures intended to mitigate for the loss in habitat connectivity through barrier construction, including trap & sort, denil fishways, slotted fishways, or jumping pools. Finally, Alternatives 1, 3a, and 4a will result in some level of inundation, whether seasonal or permanent, that will alter in-stream, riparian, and wetland habitat in the Project Area. These environmental implications are all considered in the Ecological Benefit analysis. Further analysis of the effects of each alternative on environmental and cultural resources are described in Section 4.

Other Social Effects (OSE)

The OSE account displays the effects of the plan on social conditions, including community cohesion, environmental justice, recreation, and public well-being. Each alternative includes a recreational measure, the portage, to provide ancillary recreational benefit and mitigate potential public safety concerns associated with electrical barriers. The alternative plans do result in different impacts on public safety. Alternative 1 presents a life safety risk to recreational users of Conneaut Creek due to the size of the dam proposed. The electrical barrier proposed for Alternatives 2, 3a, and 4a may impact public safety during the sea lamprey migration season, but a safety mitigation plan will be developed for each of these alternatives to minimize, or eliminate, public safety risks associated with the barrier.

3.7.6 P&G Criteria

The P&G criteria include acceptability, completeness, effectiveness, and efficiency. The P&G criteria were used to screen alternatives in the initial array as described in Section 3.4.2 of this report. Alternatives were qualitatively scored (i.e., low, moderate, high) based on the plan's ability to satisfy each P&G criterion. These scores were informed by best professional judgment, research, and discussion with partner agencies. Alternatives that were unable to satisfy all four of the P&G criteria were eliminated from further consideration. A summary of the final array of alternatives and the extent to which each alternative satisfies the P&G criteria is provided in Table 22.

Table 22: Summary of each alternative plan's ability to satisfy the P&G criteria.

Alternatives	Completeness	Effectiveness	Efficiency	Acceptability
No Action	**Yes.** This alternative represents the status quo and accounts for all necessary actions.	**No.** No measures for blocking sea lamprey are proposed and lampricide will be required for control.	**Yes.** This alternative is cost-effective.	**No.** Continued use of lampricide is not acceptable to the non-federal sponsor and not supported by resource agencies.
1 - Fixed Crest (High), Trap & Sort, Denil	**Yes.** This alternative accounts for all necessary actions to ensure benefits are realized.	**No.** Highly effective at blocking sea lamprey and would reduce/eliminate the need for lampricide. **High adverse impacts to the natural environment.**	**No.** This alternative is not cost-effective	**No.** This project is not supported by the non-federal sponsor and is not anticipated to have support from the public or resource agencies.
2 - Electric, Trap & Sort	**Yes.** This alternative accounts for all necessary actions to ensure benefits are realized.	**Yes.** Moderately effective at blocking sea lamprey and likely to reduce but eliminate the future need for lampricide. Low adverse impacts to the natural environment.	**Yes.** This alternative is cost-effective.	**Yes.** This alternative is possibly supported by local stakeholders and non-federal sponsors if a fixed or adjustable crest barrier is unachievable.
3a - Fixed Crest (Low), Electric, Trap & Sort, Slotted Fishway, Jumping Pool	**Yes.** This alternative accounts for all necessary actions to ensure benefits are realized.	**Yes.** Highly effective at blocking sea lamprey and would reduce/eliminate the need for lampricide. Low adverse impacts to the natural environment.	**Yes.** This alternative is cost-effective.	**Yes.** This project is supported by the non-federal sponsor and is anticipated to have support from the public and resource agencies.
4a - Adjustable Crest (Low – Obermeyer), Electric, Trap & Sort, Jumping Pool	**Yes.** This alternative accounts for all necessary actions to ensure benefits are realized.	**Yes.** Highly effective at blocking sea lamprey and would reduce/eliminate the need for lampricide. Low adverse impacts to the natural environment (lower than Alt 3).	**Yes**. This alternative is cost-effective and a "Best-Buy" plan.	**Yes.** This project is supported by the non-federal sponsor and is anticipated to have support from the public and resource agencies.

The P&G criteria are also incorporated into other components of plan evaluation. Efficiency is further considered and quantified through the CE/ICA analysis conducted to identify cost effective plans in support of the NED account. Effectiveness is considered and quantified through calculation of the net ecosystem uplift in support of the EQ account. Acceptability and completeness are considered under the OSE account and associated analyses.

3.7.7 Risk and Uncertainty

The primary areas of risk and uncertainty associated with this project relate to real estate acquisition and public safety. Risk and uncertainty will be reduced, or eliminated, through additional coordination and analysis conducted during the design phase prior to construction.

Implementation of Alternatives 1, 2, 3a, and 4a require acquisition of real estate to support project operation and maintenance. Such real estate includes acquisition of flowage easements on streamside properties that will experience inundation upon construction. The parcels subject to inundation are currently privately owned. The nonfederal sponsor will need to work with these landowners to secure real estate necessary for project construction. The non-federal sponsor has indicated that it does not wish to utilize eminent domain for this project and also does not want other agencies or groups to utilize eminent domain on their behalf for this project. Because of this, there will be no path forward to acquire the land necessary to complete the project if any landowner within the project footprint does not willingly agree to sell the land necessary to construct and maintain the project. This risk can be lowered by selecting a barrier type that minimizes the extent and duration of upstream inundation while still effectively blocking sea lamprey. Significant coordination with private landowners was conducted during this feasibility study to reduce this risk to the extent practicable.

Additionally, each alternative has the potential to impact public safety. The large fixed-crest dam proposed in Alternative 1 presents a life safety risk to recreational users of Conneaut Creek, while the electric barrier proposed in Alternative 2, 3a, and 4a may also adversely impact public safety. Risk associated with public safety will be minimized through development of a detailed safety plan for the recommended plan during the design phase.

3.7.8 Climate Preparedness and Resiliency

Engineering and Construction Bulletin 2018-14 Guidance for Incorporating Climate Change Impacts to Inland Hydrology in Civil Works Studies, Design and Projects (ECB 2018-14) is a policy that supports the requirement for the consideration of climate change in all current and future studies to reduce vulnerabilities and enhance the resilience of our water resources infrastructure. The following discussion and qualitative assessment support the engineering and planning decisions ensuring that decision making is consistent with USACE climate change adaptation policy. Refer to the Appendix A-2 for full details of the climate preparedness and resiliency analysis conducted for this study.

Literature review of climate change shows a strong historic trend of increased precipitation and temperatures in the U.S. and the Northeast from the early 20th century to today. These trends are projected to continue through the late 21st century according to several climate models. Increased temperatures, precipitation, and magnitude and frequency of storm events are projected to increase throughout the Northeast and the Conneaut Creek watershed in the future.

The USACE Climate Hydrology Assessment Tool (CHAT) and Non-stationarity Detection Tool (NSD) were used to investigate historical and projected future trends in streamflow for HUC 04120101, the Chautauqua-Conneaut watershed. The NSD tool identified no significant changes in recorded streamflow throughout the period of record for Conneaut Creek. Additionally, the monatomic trend analysis determined a statistically significant decreasing trend in flow. The CHAT tool also determined a statistically significant decrease in projected streamflow for the Chautauqua-Conneaut Watershed. This is opposite of what would normally be expected with the projected climate-change scenarios. There is a

discrepancy between historic and projected increases in precipitation compared to streamflow for Conneaut Creek.

A potential reason why increased precipitation has not correlated to increased streamflow could be the land use of the watershed. Although increasing, the Conneaut Creek Watershed has experienced little development and is a largely forested and agricultural watershed. This could buffer streamflow increases due to the amount of storage, interception, and infiltration of precipitation within the watershed leading to less runoff and increased time of concentration. The projected streamflow analysis is a linear regression of historic data extrapolated in the future. There could be a point where these 'buffering factors' for precipitation are exceeded due to continued increases in the future and streamflow in turn starts to increase.

The effects of climate change on the watershed can be both negative and positive. While occasional flooding can be beneficial in terms of ecosystem restoration, as floodplain/riparian habitat and wetlands are inundated more frequently, it could also negatively affect native fish instream habitat, migration and sediment transport due to increases in frequency and magnitude of large flows in the river. Conversely, significant droughts or a decreasing trend in streamflow in the basin could also negatively affect fish migration, particularly steelhead runs, due to insufficient streamflow for adequate spawning pool depths. Decreases in streamflow could also negatively impact recreation (e.g., water sports, fishing). Flood risk would either be increased or decreased with decreasing trends or increasing trends in streamflow, respectively.

In terms of a lamprey barrier, increases in flow would lead to the assumption that the level of protection against lamprey migration is decreased, at least in terms of flow frequency. That is, if the project was designed to the 10% ACE plus 18-inch elevation, the 10% ACE flow over time would increase and the barrier design would provide protection for an event that historically was a 10% ACE event but is now a lower frequency event. Higher and more frequent events could also mean secondary protection against lamprey (e.g., electrical) are utilized more frequently and for a longer duration. A decrease in flows would result in the project providing a higher level of protection than for which it was initially designed. Considerations of climate change on the barrier level of protection and fish passage structures will be considered in the final design of the structure.

3.7.9 Significance of Outputs

Assessment of the significance of ecosystem outputs is necessary to determine whether an alternative should be recommended. Statements of significance provide qualitative information to aid in determining whether the value of the ecosystem outputs produced by a given alternative justify the investment required to produce them. The significance of ecosystem outputs should be considered alongside results of the CE/ICA during plan comparison. USACE policy requires assessment of the institutional, public, and technical significance of the alternatives.

Institutional Significance

Significance based on institutional recognition means that the importance of an environmental resource is acknowledged in the laws, adopted plans, and other policy statements of public agencies, tribes, or private groups. Sources of institutional recognition include public laws, executive orders, rules and regulations, treaties, and other policy statements of the Federal Government; plans, laws, resolutions, and other policy statements of states with jurisdiction in the study area; laws, plans, codes, ordinances, and other policy

statements of regional and local public entities with jurisdiction in the study area; and charters, bylaws, and other policy statements of private groups.

Fish and Wildlife Conservation Act of 1980 – The Fish and Wildlife Conservation Act requires all federal departments and agencies to conserve and promote, to the extent practicable and consistent with agency authorities, conservation of non-game fish and wildlife and their habitats. Implementation of a barrier to sea lamprey migration aids in conservation of non-game fish through reduction in lampricide use and blocking sea lamprey access to spawning habitats, which in turn reduces associated negative impacts to Conneaut Creek and the Great Lakes Fishery. Alternative 1 will result in unacceptable impacts to the environment. For the remaining alternatives, impacts to aquatic habitat will be minimized through implementation of fish passage mitigation features (i.e., trap and sort, fishway, etc.).

Executive Order (EO) 11514: Protection and Enhancement of Environmental Quality – EO 11514 directs the Federal Government to provide leadership in protecting and enhancing the quality of the Nation's environment to sustain and enrich human life. Alternative 1 will result in unacceptable environmental impacts. Alternatives 2, 3a, and 4a will result in net positive impacts to Conneaut Creek and the Great Lakes fishery.

EO 13340: Establishment of Great Lakes Interagency Task Force and Promotion of a Regional Collaboration of National Significance for the Great Lakes – EO 13340 identified the Great Lakes as a national treasure and defined a federal policy to support local and regional efforts to restore and protect the Great Lakes ecosystem through the establishment of regional collaboration. The USACE and other federal agencies have worked in partnership with state, tribal, and local governments to accomplish activities set forth in EO 13340. The EO also established the Great Lakes Interagency Task Force. The Task Force worked with governors, mayors, and tribal leaders across the eight Great Lakes states to establish the Great Lakes Regional Collaboration. The initial goal of the Collaboration was to develop a "strategy for the protection and restoration of the Great Lakes" within one year. The Collaboration worked with approximately 1,500 stakeholders to develop the strategy for the following eight priority issues:

1. Toxic contaminants
2. Non-point source pollution
3. Coastal health
4. **Habitat/species**
5. Contaminated sediments/Areas of Concern (AOCs)
6. Indicators/information
7. Sustainable development
8. **Invasive species**

All project alternatives will address the bolded priority issues.

Public Recognition

Public recognition means that some segment of the general public recognizes the importance of an environmental resource, as evidenced by the people engaged in activities that reflect an interest or concern for that particular resource. Such activities may involve membership in an organization, financial contributions to resource-related efforts, and providing volunteer labor and correspondence regarding the importance of the resource. Significant coordination conducted with PFBC, USFWS, and other resource agencies throughout the planning process suggests significant community interest in protection of Conneaut Creek from sea lamprey.

Technical Recognition

Technical recognition means that the resource qualifies as significant based on scientific knowledge or judgment of critical resource characteristics. Determinations of resource technical significance may vary based on differences across geospatial areas and spatial scale. While technical significance may depend on whether a local, regional, or national perspective is undertaken, typically a watershed or larger (e.g., ecosystem, landscape, or ecoregion) context should be considered. Technical significance should be described in terms of one or more of the following criteria or concepts: scarcity, representation, status and trends, connectivity, limiting habitat, and biodiversity.

Scarcity – Scarcity is a measure of a resource's relative abundance within a specified geographic range. Measures of scarcity range from "rare" or "unique" to "widespread" or "abundant." Generally, scientists consider a habitat or ecosystem to be rare if it occupies a narrow geographic range (i.e., limited to a few locations) or occurs in small groupings. Unique resources, those unlike any others found within a specified range, may also be considered significant as well as resources that are threatened by interference from both human and natural causes. Conneaut Creek is a high-quality tributary to Lake Erie. Conneaut Creek provides habitat for six state listed species. In Ohio, 21 miles of Conneaut Creek are also designated as a state scenic river, 16.4 miles of which are also designed as wild (ODNR, 2021). These designations highlight the importance of Conneaut Creek as a unique aquatic resource warranting state protection of both the habitat and species within it.

Each alternative proposed under this study may impact the quality of Conneaut Creek through construction of a barrier to limit sea lamprey migration. However, these impacts are compensated for through seasonal operation, trap and sort structures, or other fish passage structures, as feasible. Furthermore, the proposed project will minimize or eliminate the need for lampricide within Conneaut Creek, reducing the exposure of native species to harmful chemicals while continuing to protect the Lake Erie fishery from invasive lamprey. As such, the alternatives proposed in this study will ultimately result in protection of Conneaut Creek and the Lake Erie fishery from impacts associated with sea lamprey and preserve the unique ecosystem of Conneaut Creek.

Representation – Representation is a measure of a resource's ability to exemplify the natural habitat or ecosystems within a specified range. The presence of a large number and percentage of native species, and the absence of exotic species, implies representation. Undisturbed habitat is also considered to imply representation. Conneaut Creek watershed is relatively rural, and as a result, the creek exhibits high quality in-stream and riparian habitat. However, sea lampreys currently utilize Conneaut Creek for spawning activities. All alternatives would block sea lamprey migration into the affected portion of Conneaut Creek, thereby reducing invasive species populations in the creek. Each alternative does require implementation of a barrier and fish passage structure, which modify the natural habitat in the Creek. Based on the ecological analysis, impacts to the natural habitat associated with Alternatives 2, 3a, and 4a are justified by the extent of ecological uplift derived from each alternative.

Status and trends – Status and trends consider previous, current, and future conditions of the ecosystem and the relationships between these conditions. If a sea lamprey control barrier was not constructed, TFM treatments would be required to control sea lamprey within Conneaut Creek, and potentially within the East Branch of Conneaut Creek upstream of the Bessemer Dam in the event of failure. TFM treatments negatively impact some native species in Conneaut Creek. It is likely that these negative impacts would continue, and the quality of the Conneaut Creek fishery may decline as a result. Additionally, should the Bessemer Dam fail, TFM treatments would negatively impact the northern brook lamprey in East Branch

of Conneaut Creek. These negative impacts would hinder state conservation actions and may impact recovery of this species.

Connectivity – Connectivity is a measure of how, and to what degree, organisms can pass between habitats unimpeded. Currently, Conneaut Creek is a free-flowing stream, with no existing barriers on the mainstem of the creek. Each alternative proposed in this study impacts habitat connectivity within Conneaut Creek under certain flow conditions, and additional measures are proposed for each alternative to provide native species passage. Alternative 1 will result in the greatest impact to habitat connectivity due to the size and permanence of the structure, and Alternative 2 will result in the lowest impact to habitat connectivity, with habitat connectivity restored outside of the sea lamprey migration season. Adjustable, seasonally operated structures and trap and sort structures are proposed as part of these alternatives to minimize impacts to native species passage.

Limiting Habitat – Limiting habitat is considered habitat that is important for the conservation, survival, or recovery of one or more species. Limiting habitat may include designated critical habitat, which is designated under federal or state law. There is no designated critical habitat within the vicinity of the proposed project.

Biodiversity – Biodiversity is a measure of the variety of distinct species and the genetic variability within each species in a defined ecosystem. Implementation of a permanent barrier as proposed in Alternatives 1 and 3a may impact biodiversity by segmenting populations of fish species and reducing opportunities for breeding between upstream and downstream populations. However, implementation of fish passage mitigation features, as proposed, will minimize the effects of the barrier on genetic variability to the extent practicable. Alternatives 2 and 4a may impact biodiversity by limiting species passage during the sea lamprey migration period, but fish passage would resume unimpeded the rest of the year. As with Alternatives 1 and 3a, fish passage mitigation features proposed for Alternatives 2 and 4a will minimize impacts to biodiversity to the extent practicable.

Budget Guidance

The purpose of the Conneaut Creek GLFER Sea Lamprey Barrier Project is to implement a permanent sea lamprey barrier to achieve a more integrated and effective sea lamprey control strategy and reduce the use of lampricide in Conneaut Creek, PA. The USACE FY24 Budget Guidance in EC 11-2-226, Civil Works Direct Annual Execution Program Guidance, and associated Program Development Manual identifies seven performance components that provide an indication of the significance of environmental resources. Numerical scores will be developed for each of the components, and these scores will be used to support ranking and selection of projects for implementation. The following apply to all project alternatives:

- Habitat Scarcity – Score of 20/25 points
- Connectivity – Score of 10/25 points
- Special Status Species – Score of 8/10 points
- Hydrologic Character – Score of 15/20 points
- Geomorphic Condition – Score of 15/20 points
- Self-Sustaining – Score of 15/20 points
- Plan Recognition – Score of 8/10 points
- National Significance – Yes
- Regional Significance – Yes

Detailed discussions regarding habitat scarcity, connectivity, special status species, and plan recognition are provided in the preceding paragraphs within this Section. Conneaut Creek was assessed to have good

existing hydrologic character and geomorphic conditions, as supported by the QHEI and other assessments conducted for this study as well as the lack of channelization or existing barriers within Conneaut Creek. The alternatives proposed for this study will result in modification of the hydrologic character of Conneaut Creek through construction of the barrier, but this impact will be minimized by siting the barrier downstream of an existing bridge. Inundation associated with barrier construction may result in slight modification of the geomorphic conditions of Conneaut Creek, but the severity of these impacts varies by alternative. Alternatives proposed for this study require operations and maintenance of certain components, such as the electrical barrier, trap and sort structures, and seasonally operated barriers, but these alternatives reduce or eliminate the need for lampricide use in Conneaut Creek. Therefore, the operations and maintenance associated with the alternatives may be considered a tradeoff of reducing chemical use within the creek. Sea lamprey control was identified as a binational priority for management of the Great Lakes fishery, and the GLFC considers sea lamprey control a high priority of the ecological sustainability of the Lake Erie fishery. As such, sea lamprey control has high national and regional significance.

Section 4 Affected Environment and Environmental Consequences

4.1 Affected Environment (40 CFR 1502.15) and Environmental Consequences (40 CFR 1502.16)

This section presents the environmental impact assessment of the alternatives considered in this feasibility study. The project has been evaluated for engineering and economic feasibility, environmental and social acceptability, and its ability to meet the planning objectives.

Only the final array of alternatives (i.e., No Action & Alternatives 1, 2, 3a, and 4a) are discussed in detail in this section. Two other alternatives were considered but were screened out earlier in the planning process due to their not meeting one or more of the following criteria: acceptability, completeness, efficiency, or effectiveness (Refer to Section 3).

A summary impacts table for the final array of alternatives that were carried forward is provided in Table 23. For some environmental considerations, the no action as well as the proposed action would result in no effect to the environmental resource under consideration and would reflect a continuation of existing conditions. This is described where appropriate. The *Project Area* referenced in the following sections refers to Conneaut Creek and/or the land adjacent to Conneaut Creek from approximately 300 linear feet (LF) downstream of the Griffey Road Bridge upstream to SR 6N bridge. There were no other alternatives considered that achieve the project purpose and are likely to have less adverse environmental impacts and more net benefits than Alternative 4a: Adjustable Crest (Low – Obermeyer), Electric, Trap & Sort, Jumping Pool.

Agencies, interest groups, and the general public that have been contacted during preparation of this EA are listed in Section 7.2. A Scoping Information Packet was distributed to these individuals on July 22, 2022 and this draft DPR/EA is available for a 30-day public/agency review. Comments received to date are included in Appendix A-6.

Table 23. Summary table of the impacts associated with the final array of alternatives.

Public Interest Factor	No Action Alternative	Alternative 1 Fixed Crest (High) Trap & Sort, Denil	Alternative 2 Electric, Trap & Sort	Alternative 3a Fixed Crest (Low), Electric, Trap & Sort, Slotted Fishway, Jumping Pool	Alternative 4a Adjustable Crest (Low – Obermeyer), Electric, Trap & Sort, Jumping Pool
Demographics	No Effect	No Effect	No Effect	No Effect	No Effect
Associated Land Use and Development	No Effect	Permanent detrimental impact due to permanent impoundment of 61.3 acres upstream.	Temporary minor detrimental impact	Temporary and permanent minor detrimental impacts	Temporary minor detrimental impact
Public Facilities and Services	No Effect	Temporary minor detrimental effect during construction	Temporary minor detrimental effect during construction	Temporary minor detrimental effect during construction	Temporary minor detrimental effect during construction
Water and Sewer Facilities	No Effect	No Effect	No Effect	No Effect	No Effect
Recreation	No Effect	Minor short-term construction related impacts and long-term recreational opportunities are impacted.	Minor short term, construction related impacts and long-term recreational opportunities are enhanced.	Minor short term, construction related impacts and long-term recreational opportunities are enhanced.	Minor short term, construction related impacts and long-term recreational opportunities are enhanced.
Noise	No Effect	Minor short-term construction related impacts.	Minor short-term construction related impacts.	Minor short-term construction related impacts.	Minor short-term construction related impacts.
Aesthetic Values	No Effect	Major detrimental effect.	Minor detrimental effect.	Minor detrimental effect.	Minor detrimental effect
Public Health and Safety	No Effect	Minor short-term construction related impacts and minor long-term impacts.	Minor short-term construction related impacts and minor long-term impacts	Minor short-term construction related impacts and minor long term detrimental impacts	Minor short-term construction related impacts. and minor long term detrimental impacts.
Transportation	No Effect	Minor short-term construction related impacts.	Minor short-term construction related impacts.	Minor short-term construction related impacts.	Minor short-term construction related impacts.
Cultural resources	No Effect	No effect to historic properties.	No effect to historic properties.	No effect to historic properties.	No effect to historic properties.
Environmental justice	No Effect	No Effect	No Effect	No Effect	No Effect
Hazardous, Toxic, and Radioactive Waste	No Effect	No Effect	No Effect	No Effect	No Effect
Air quality	No Effect	Minor short-term construction related impacts.	Minor short-term construction related impacts.	Minor short-term construction related impacts.	Minor short-term construction related impacts.

Public Interest Factor	No Action Alternative	Alternative 1 Fixed Crest (High) Trap & Sort, Denil	Alternative 2 Electric, Trap & Sort	Alternative 3a Fixed Crest (Low), Electric, Trap & Sort, Slotted Fishway, Jumping Pool	Alternative 4a Adjustable Crest (Low – Obermeyer), Electric, Trap & Sort, Jumping Pool
Water quality	No Effect	Minor short-term construction related impacts and long-term detrimental impacts.	Minor short-term construction related impacts and minor temporary impacts to fish passage during the lamprey run. Beneficial long-term impacts.	Minor short-term construction related impacts and minor temporary impacts to fish passage during the lamprey run. Beneficial long-term impacts.	Minor short-term construction related impacts. and minor temporary impacts to fish passage during the lamprey run. Beneficial long-term impacts.
Sediment Quality	No Effect	Clean fill will be used for construction of earthen berms, major permanent impact to sediment transport.	Clean fill will be used for construction of earthen berms. No effect on sediment transport	Clean fill will be used for construction of earthen berms., minor permanent impact to sediment transport	Clean fill will be used for construction of earthen berms, minor temporary impacts to sediment transport
Greenhouse Gases and Climate Change	No Effect	Short-term construction related emissions.	Short-term construction related emissions.	Short-term construction related emissions.	Short-term construction related emissions.
Benthos	Minor detrimental impact from periodic lampricide applications	Temporary construction related loss of benthic organisms. Long-term impact to benthos.	Temporary construction related loss of benthic organisms. Long-term benefit to benthos.	Temporary construction related loss of benthic organisms. Long-term benefit to benthos.	Temporary construction related loss of benthic organisms. Long-term benefit to benthos.
Vegetation	No Effect	Temporary construction related loss of vegetation. Major long-term impact to forested riparian buffer.	Temporary construction related loss of vegetation	Temporary construction related loss of vegetation and long-term minor impact.	Temporary construction related loss of vegetation and long-term minor impact.
Streams and Floodplains	No Effect	Temporary construction related impacts and. major long term detrimental impact	Temporary construction related impacts that are offset by long term beneficial impacts	Temporary construction related impacts and. minor impacts that are offset by long term beneficial impacts	Temporary construction related impacts and. minor impacts that minor impacts that are offset by long term beneficial impacts
Fisheries	Minor detrimental impact from periodic lampricide applications	Long Term detrimental Impact	Minor seasonal impact to fish movement. Beneficial long-term impact.	Beneficial long-term impact.	Beneficial long-term impact.
Wetlands	No Effect	Minor short-term construction related impacts, major long-term impacts.	Minor short-term construction related impacts	Temporary construction related impacts and temporary minor impacts that are offset by long term beneficial impacts.	Temporary construction related impacts and temporary minor impacts that are offset by long term beneficial impacts
Wildlife	No Effect	Long term detrimental impact	Beneficial long-term impact.	Beneficial long-term impact.	Beneficial long-term impact.
Threatened and Endangered Species	No Effect	May affect not likely to adversely effect	May affect not likely to adversely effect	May affect not likely to adversely effect	May affect not likely to adversely effect

Note: Impacts were assessed as major adverse, minor adverse, resource unaffected (no effect), resource unaffected through mitigation, minor beneficial, or major beneficial impacts. Additionally, impacts could be temporary, permanent, or not applicable.

4.2 Socio-Economic Impacts

4.2.1 Demographics

The area surrounding the project area is predominantly woodland with agricultural development and some residential areas. The population for Erie County, Pennsylvania is over 267,000 people with 86.6 percent white, 8.0 percent black or African American, 4.9 percent Hispanic or Latino, and 2.2 percent Asian. This is approximately 6 percent more white and 4.2 percent less black or African American, 3.7 percent less Hispanic or Latino, and 1.9 percent less Asian population than the averages for the Commonwealth of Pennsylvania. The median household income for Erie County is $55,949, which is approximately $1,500 per year less than the average household income for the Commonwealth of Pennsylvania. The larger urban development within the watershed is located downstream in the City of Conneaut, Ohio.

No Action Alternative

There would be no impact to regional demographics associated with the No Action Alternative as there would be no federal action. Potential changes to demographics are not tied to completing or not completing a sea lamprey barrier on Conneaut Creek at Griffey Road.

Alternatives 1, 2, 3a, & 4a

The sea lamprey barrier at Griffey Road would have no impact on regional demographics. No residential, commercial, or industrial infrastructure would be impacted by the project. Therefore, no population shifts are anticipated as a result of implementation.

4.2.2 Associated Land Use and Developments

See Section 2.4 for description of existing conditions.

No Action Alternative

No changes to land use or associated developments would be expected with the implementation of the No Action Alternative. No land use changes are expected in the event no federal project is constructed.

Alternative 1

Construction of the Fixed Crest High Barrier at Griffey Road would result in a permanent impoundment of over 61.3 acres of area upstream that currently consists of 22.9 acres of wetlands, 26.6 acres of perennial stream (Conneaut Creek), and 11.8 acres of forested riparian uplands. This will cause a permanent detrimental impact that is not offset by the protection of over 513 acres of stream habitat upstream from sea lamprey.

Alternative 2

Implementation of the electric barrier would not impound water upstream or impact land use upstream of the barrier. However, it would require construction of a portage facility upstream and around the electric barrier site for canoers and kayakers that currently pull out downstream of the bridge at the ODNR access site near the proposed project area. The electric barrier would only be operated during the sea lamprey spawning season (March – July) and then would not be operated for the remainder of the year. There will be a temporary minor impact during construction of the barrier as the parking area and access road to the creek are currently proposed as construction access and thus would be temporarily closed to public use.

The new portage would help offset the impact to the current access area during the approximately five months of the year it would be operated.

Alternative 3a

Implementation of the low fixed crest barrier with electrical barrier and slotted fishway would result in a permanent impoundment of approximately 3.8 acres of areas upstream that currently consists of 0.98 acre of wetland, 2.66 acres of perennial stream (Conneaut Creek) and 0.16 acre of forested riparian uplands. This is a minor detrimental impact that is offset by the benefits associated with the protection of over 513 acres of stream habitat upstream from sea lamprey and reducing the need to apply lampricides periodically to help control them. The areas upstream are currently undeveloped forested riparian areas. There will be a similar temporary minor detrimental impact associated with temporary closure of the public parking area and stream access road during construction of the barrier as described for Alternative 2. In addition, the construction of portage described above in Alternative 2 will help offset impacts to the currently used access area downstream of the bridge.

Alternative 4a

Implementation of the low adjustable crest barrier with electrical barrier would result in a temporary impoundment of approximately 3.8 acres of areas upstream that currently consists of 0.98 acre of wetland, 2.66 acres of perennial stream (Conneaut Creek), and 0.16 acre of forested riparian uplands. The barrier would be operational during the lamprey spawning season (March 1 -June 30) and then lowered for the remainder of the year. Thus, the seasonal impoundment of water each year would result in a smaller detrimental impact than for Alternative 3a, which would result in higher overall net benefits associated with the protection of over 513 acres of stream habitat upstream from sea lamprey and reducing the need to apply lampricides periodically to help control them. There will be a similar temporary minor detrimental impact associated with temporary closure of the public parking area and stream access road during construction of the barrier as described for Alternative 2. In addition, the construction of portage described above in Alternative 2 will help offset impacts to the currently used access area downstream of the bridge.

4.2.3 Public Facilities and Services

There is currently a parking area and path on the right descending bank of the creek that is owned by PFBC that is used for public access for fishing and recreational canoeing and kayaking immediately downstream of Griffey Road Bridge.

No Action Alternative

There would be no changes to public facilities and services with the implementation of the No Action Alternative.

Alternative 1

Implementation of the high fixed crest barrier would require construction of a portage facility upstream and around the barrier site for canoers and kayakers that currently pull out downstream of the bridge at the PFBC access site near the proposed project area. Use of the portage would be required year-round. There will be a temporary minor impact during construction of the barrier as the parking area and access road to the creek are currently proposed as construction access and thus this would be temporarily closed to public use.

Alternative 2, 3a, & 4a

Implementation of these barriers would require construction of a portage facility upstream and around the barrier site for canoers and kayakers that currently pull out downstream of the bridge at the PFBC access site near the current site chosen for the project. There will be a temporary minor impact during construction of the barrier as the parking area and access road to the creek are currently proposed as construction access and thus this would be temporarily closed to public use.

4.2.4 Water and Sewer Facilities.

No Action Alternative and Alternatives 1, 2, 3a, & 4a

Implementation of a sea lamprey barrier at Griffey Road would not impact water and sewer facilities within the vicinity of the project since no such facilities are present. The residents in the surrounding area use wells for their potable water. The nearest sewage treatment plant discharge is approximately nine miles upstream in the City of Albion.

4.2.5 Recreation

As mentioned in Section 4.2.3, there is currently a parking area and path on the right descending bank of the creek that is owned by PFBC that is used for public access for fishing and recreational canoeing and kayaking immediately downstream of Griffey Road Bridge.

No Action Alternative

There would be no change to existing recreational opportunities associated with the No Action Alternative.

Alternative 1

Construction of the Fixed Crest High Barrier at Griffey Road would result in a permanent impoundment of over 61.3 acres of area upstream that currently consists of 22.9 acres of wetlands, 13,426 LF of perennial stream (Conneaut Creek) and 1,784.3 LF of unnamed intermittent streams for a total of 26.6 acres of intermittent/perennial stream and 11.8 acres of forested riparian uplands. There is a temporary impact to recreational opportunities during construction of the barrier as the parking area and access road to the creek are currently proposed as construction access and thus this would be temporarily closed to public recreation. The new portage would help offset the impact to the current access area and the large impoundment may temporarily have a beneficial impact to recreation. However, the potential permanent impacts to the wetlands and stream and limited fish passage will likely result in a permanent detrimental impact that is not offset by the protection of over 513 acres of stream habitat upstream from sea lamprey.

Alternative 2

As mentioned in Section 4.2.2, implementation of the electric barrier would not impound water upstream or impact land use upstream of the barrier. However, it would require construction of a portage facility upstream and around the electric barrier site for canoers and kayakers that currently pull out downstream of the bridge at the PFBC access site near the proposed project location. There will be a temporary minor impact during construction of the barrier as the parking area and access road to the creek are currently proposed as construction access and thus this would be temporarily closed to public use. The new portage would help offset the impact to the current access area during the approximately five months of the year it would be operated.

Alternative 3a

As mentioned in Section 4.2.2, implementation of the low fixed crest barrier with electrical barrier and slotted fishway would result in a permanent impoundment of approximately 3.8 acres of areas upstream that currently consists of 0.98 acre of wetland, 1,489 LF of perennial stream (Conneaut Creek) and 324.5 LF of unnamed intermittent stream for a total of 2.66 acres of intermittent/perennial stream, and 0.16 acre of forested riparian uplands. This is a minor detrimental impact that is offset by the benefits associated with the protection of over 513 acres of stream habitat upstream from sea lamprey and reducing the need to apply lampricides periodically to help control them. The areas upstream are currently undeveloped forested riparian areas. There will be a similar temporary minor detrimental impact during construction of the barrier as described for Alternative 2. In addition, the construction of portage described above in Alternative 2 will help offset impacts to the currently used access area downstream of the bridge. Reduction in the passage of sea lamprey coupled with the reduction in lampricide application may improve fish community and enhance recreational fishing opportunities in the long term.

Alternative 4a

As mentioned in Section 4.2.2, implementation of the low adjustable crest barrier with electrical barrier would result in a temporary impoundment of approximately 3.8 acres of areas upstream that currently consists of 0.98 acre of wetland, 1,489.4 LF of perennial stream (Conneaut Creek) and 324.5 LF of unnamed intermittent stream for a total of 2.66 acres of intermittent/perennial stream, and 0.16 acre of forested riparian uplands. The barrier would be operational during the lamprey spawning season (March 1 – June 30) and then lowered for the remainder of the year. Thus, the seasonal impoundment of water each year would result in a smaller detrimental impact than for Alternative 3a, which would result in higher overall net benefits associated with the protection of over 513 acres of stream habitat upstream from sea lamprey and reducing the need to apply lampricides periodically to help control them. The areas upstream are currently undeveloped forested riparian areas. There will be a similar temporary minor detrimental impact during construction of the barrier as described for Alternative 2. In addition, the construction of a portage as described above in Alternative 2 will help offset impacts to the currently used access area downstream of the bridge. Reduction in the passage of sea lamprey coupled with the reduction in lampricide application may improve fish community and enhance recreational fishing opportunities in the long term.

4.2.6 Noise

As mentioned in Section 2.3.3, the sparse development within the watershed benefits the riparian habitat and in-stream conditions of Conneaut Creek, both of which are considered high quality. From the NLCD data, approximately 84 percent of the Federal Emergency Management Agency (FEMA) Zone A floodplain, which represents the approximate 100-year Annual Chance Exceedance (ACE) floodplain, is classified as forested or wetlands (48% forest, 36% wetland). Only four percent of the floodplain is developed, and the remaining twelve percent is pasture/agricultural land. The existing noise levels are less than 45 dBA 24-hour equivalent continuous level (LAeq) which equates to a quiet residential area (Figure 23) (USDOT 2022).

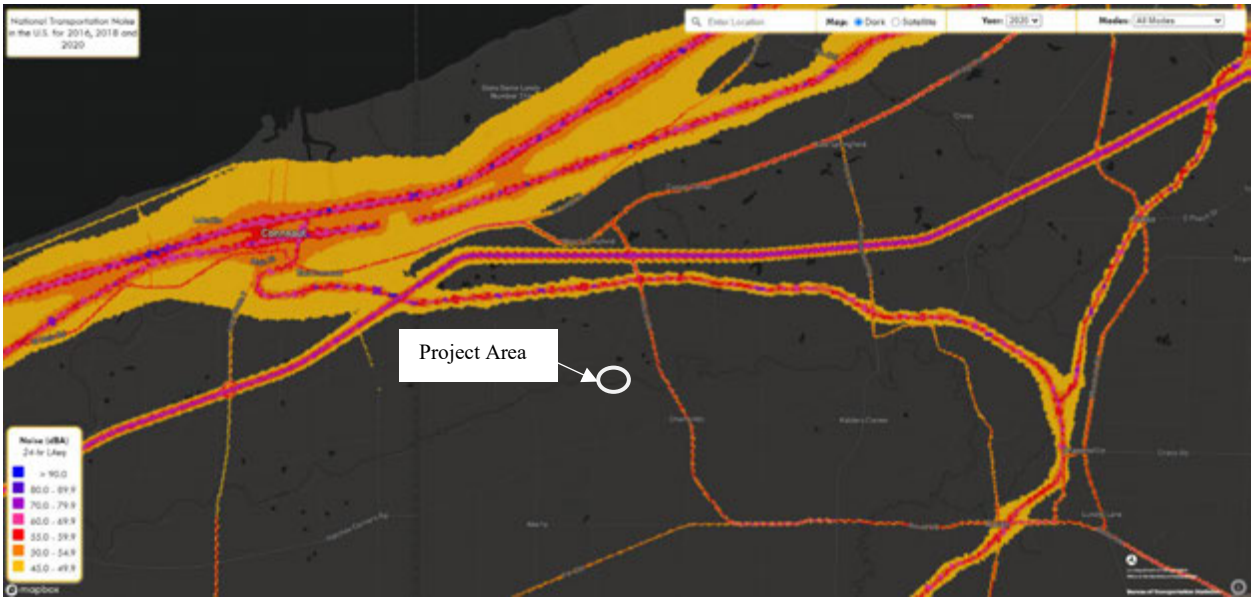


Figure 23: National Transportation Noise Map for the Griffey Rd Project Area.

No Action Alternative

There would be no noise impacts associated with the No Action Alternative as there would be no federal action.

Alternatives 1, 2, 3a, & 4a

Construction of a barrier project would result in a short-term and localized increase in noise sources. Noise generated by the action would be a result of normal construction practices and the operation of machinery. This short-term increase in noise would be temporary and localized in the vicinity of the project area and construction activities. All equipment used during the project's construction would be required to have proper muffling devices in compliance with the Occupational Safety and Health Act (OSHA).

4.2.7 Aesthetic Values

Section 2.3.3 describes the relatively undeveloped nature of the study area, with this area being predominantly woodland with agricultural development and some residential development. Griffey Road Bridge is located immediately upstream of the proposed project location.

No Action Alternative

There would be no change to the existing aesthetic value associated with the No Action Alternative as there would be no federal action.

Alternative 1

The presence of construction equipment would temporarily detract from the aesthetic quality of the area. The re-suspension of fine-grained particles in the water column during construction would result in a short-term reduction of clarity and alteration in the color of the water, although this is expected to be very minor due to the mostly contained nature of this construction area. To further minimize this effect, the selected contractor would be required to implement best management practices and control measures to

reduce any construction related impacts. Construction of the Fixed Crest High Barrier at Griffey Road would result in a permanent impoundment of over 61.3 acres of area upstream that currently consists of 22.9 acres of wetlands, 13,426.2 LF of perennial stream (Conneaut Creek) and 1,789.3 LF of unnamed intermittent streams for a total of 26.6 acres of intermittent/perennial stream, and 11.8 acres of forested riparian uplands. This is a major permanent detrimental impact to aesthetic values of this area.

Alternative 2

The presence of construction equipment would temporarily detract from the aesthetic quality of the area. The re-suspension of fine-grained particles in the water column during construction would result in a short-term reduction of clarity and alteration in the color of the water, although this is expected to be very minor due to the mostly contained nature of this construction area. To further minimize this effect, the selected contractor would be required to implement best management practices and control measures to reduce any construction related impacts. The electric barrier does not impound any water and thus would have a minimal permanent impact, if any, on aesthetic values.

Alternative 3a

The presence of construction equipment would temporarily detract from the aesthetic quality of the area. The re-suspension of fine-grained particles in the water column during construction would result in a short-term reduction of clarity and alteration in the color of the water, although this is expected to be very minor due to the mostly contained nature of this construction area. To further minimize this effect, the selected contractor would be required to implement best management practices and control measures to reduce any construction related impacts. Implementation of the low fixed crest barrier with electrical barrier and slotted fishway would result in a permanent impoundment of approximately 3.8 acres of areas upstream that currently consists of 0.98 acre of wetland, 1,489.4 LF of perennial stream (Conneaut Creek) and 324.5 LF of unnamed intermittent stream for a total of 2.66 acres of intermittent/perennial stream, and 0.16 acre of forested riparian uplands. This would result in a minor detrimental impact to the aesthetic values.

Alternative 4a

The presence of construction equipment would temporarily detract from the aesthetic quality of the area. The re-suspension of fine-grained particles in the water column during construction would result in a short-term reduction of clarity and alteration in the color of the water, although this is expected to be very minor due to the mostly contained nature of this construction area. To further minimize this effect, the selected contractor would be required to implement best management practices and control measures to reduce any construction related impacts. Implementation of the low adjustable crest barrier with electrical barrier would result in a seasonal impoundment of approximately 3.8 acres of areas upstream that currently consists of 0.98 acre of wetland, 1,489.4LF of perennial stream (Conneaut Creek) and 324.5 LF of unnamed intermittent stream for a total of 2.66 acres of intermittent/perennial stream, and 0.16 acre of forested riparian uplands. The barrier would be operational during the lamprey spawning season (March 1 -June 30) and then lowered for the remainder of the year. Thus, the seasonal impoundment of water each year would result in a smaller detrimental impact than Alternative 3a for aesthetic values and would result in a higher overall net benefits associated with the protection of over 513 acres of stream habitat upstream from sea lamprey and reducing the need to apply lampricides periodically to help control them. The areas upstream are currently undeveloped forested riparian areas.

4.2.8 Public Health and Safety

There are no significant health and safety conditions within the project area. As described in Section 2.3.3, approximately 96 percent of the FEMA 100-yr ACE floodplain in the Conneaut Creek watershed is classified as forested, wetlands, or pasture/agricultural lands. Only 4 percent of the floodplain is developed, and this occurs in areas upstream and near the confluence of the creek with Lake Erie. Thus, there are no significant flooding hazards to residents around this project area. In addition, there are no significant traffic safety issues in this area. Griffey Road has an annual average daily traffic volume of approximately 500 cars (PennDOT 2022). PAFB recently installed a parking area on the northwestern side of creek off Griffey Road to provide people who are fishing and recreational boating (kayak and canoe) a safe place to park and access Conneaut Creek. According to PAFB staff this is a popular area for recreational kayakers and canoers to take out after launching upstream in the higher flow periods of the year. Lastly, as mentioned in Section 4.2.12, USACE performed a Phase I Environmental Site Assessment (ESA) and this assessment revealed no evidence of recognized environmental conditions in connection with the study area.

No Action Alternative

There would be no change to the existing public health and safety conditions associated with the No Action Alternative.

Alternative 1

The presence and operation of construction equipment would temporarily increase associated construction site hazards. A restricted work site would be rigorously controlled to protect the public. The contractor would be required to comply with OSHA regulations to provide a safe work environment for construction crews as well as the public. There is a long term minor public safety concern regarding the high fixed crest alternative to people canoeing and kayaking on the creek and fishing. There will be buoys and control booms to keep them from potentially going over the dam and a new portage upstream and downstream of the structure. There also would be locked gates and fencing to keep the public away from the dam and spillway. Lastly, any structure that would be built will be designed to avoid creation of a submerged hydraulic jump.

Alternative 2

The presence and operation of construction equipment would temporarily increase associated construction site hazards. A restricted work site would be rigorously controlled to protect the public. The contractor would be required to comply with OSHA regulations to provide a safe work environment for construction crews as well as the public. There is a long term minor public safety concern regarding the electric barrier to people canoeing and kayaking on the creek and fishing. There will be signs, buoys, control booms, gates, and fencing to keep people a safe distance away from the electric barrier and its field during its seasonal operation.

Alternative 3a & 4a:

The presence and operation of construction equipment would temporarily increase associated construction site hazards. A restricted work site would be rigorously controlled to protect the public. The contractor would be required to comply with OSHA regulations to provide a safe work environment for construction crews as well as the public. There is a long term minor public safety concern regarding the fixed crest and adjustable crest barriers to people canoeing and kayaking on the creek and fishing. There will be

buoys and control booms to keep them from potentially going over the dam and a new portage upstream and downstream of the structure. There also would be locked gates and fencing to keep the public away from the dam and spillway. Any structure that would be built will be designed to avoid creation of a submerged hydraulic jump. Lastly, there will be signs, buoys, control booms, and gates and fencing to keep people a safe distance away from the electric barrier and its field during its seasonal operation.

4.2.9 Transportation

The Griffey Road Bridge is immediately upstream of the proposed project location and within the proposed inundation area that would be created by Alternatives 2, 3a, and 4a. As mentioned in Section, 4.3.8, there are no significant traffic safety issues in this area. Griffey Road has an annual average daily traffic volume of approximately 500 cars (PennDOT 2022).

No Action Alternative

There would be no change to the existing transportation conditions associated with the No Action Alternative.

Alternative 1, 2, 3a, & 4a

There will be a minor detrimental impact to transportation routes around the construction site due to construction vehicles bringing materials to and from the site. There is an access area already constructed that will likely be used and potentially improved to stockpile material and enable access to the construction site at the creek and minimize traffic on the surrounding roads. The PADOT has been contacted during the feasibility phase and will continue to be consulted and coordinated with as we finish feasibility and proceed through preconstruction, engineering, and design.

4.2.10 Cultural Resources

Cultural History

The Conneaut area was home to the Eriez nation which occupied the region from about 900 A.D. until the 1650s. The Eriez were fierce fighters and often battled with the neighboring Iroquois Nation. In about 1653, the Eriez retreated and later surrendered the area to the Iroquois. Another tribe known to inhabit the area included the Massassauga. The name Conneaut is believed to have been derived from the Seneca Indians who called the river Konyiat, which may have meant either “place of many fish” or “where snow lays in spring” (ODNR 2005).

Previous Investigations

A review of the National Park Service’s National Register of Historic Places (NRHP) and the Pennsylvania State Historic Preservation Office (PA SHPO) historic sites databases do not identify any historic properties within the vicinity of the area being considered for a sea lamprey barrier. The Delaware Nation, Delaware Tribe of Indians, Seneca-Cayuga Nation, Seneca Nation of Indians, Tonawanda Seneca Nation, and Wyandotte Nation are federally recognized Tribal Nations that may have ancestral homelands within the project area. The USACE is consulting with the National Park Service, PASHPO, and several potentially interested Tribal Nations as part of the NEPA review for this study to determine if there are critical sites or resources that may be impacted within our study area or if additional investigations will be necessary to determine the project’s potential for impacting cultural resources. These findings will be thoroughly coordinated with PA SHPO, Tribal Historic Preservation Offices

(THPOs), and any interested parties to ensure compliance with Section 106 of the National Historic Preservation Act (NHPA).

No Action Alternative

There would be no impact to historic (i.e., archaeological or architectural) properties or resources associated with the No Action Alternative.

Alternatives 1, 2, 3a, & 4a

The NRHP and the PA SHPO online mapper were queried for the presence of historic properties or known sites of historical importance near or within the area of potential effect (APE). There are two records identified within the APE. The first is the Griffey Road Bridge (2004RE09935), which is not eligible for listing in the NRHP. The second record is the Conneaut Path (2019RE13969), for which a determination has not yet been made as to whether or not it is eligible for listing in the NRHP. According to the documentation on the mapper, Conneaut Path was shown in the Porter-McClellan survey of Pennsylvania's western boundary. Consultation with PA SHPO and all of the federal recognized tribes for this area was initiated with the scoping document on July 22, 2022. No comments have been received from any of the tribes or PA SHPO identifying this or any other cultural resource. Due to the project type and location, USACE's finding is the proposed project would have no effect on historic/cultural resources that are eligible and/or listed in the NRHP. This finding has been coordinated with PA SHPO and they concurred with this finding on March 29, 2024 (Appendix A-6). An effects determination is being submitted to THPOs for each of the federally recognized tribes for confirmation of this determination.

4.2.11 Environmental Justice

Executive Order (EO) 12898, issued by President Clinton on February 11, 1994, requires that impacts on minority or low-income populations be accounted for when preparing environmental and socioeconomic analyses of projects or programs that are proposed, funded, or licensed by federal agencies (59 Fed. Reg. 7629 (1994)). This EO provides the most direct mandate pertaining to Environmental Justice (EJ) analysis under the National Environmental Policy Act (NEPA). More recent Executive Orders and Policy Memoranda require expanded integration of EJ priorities into the USACE Civil Works Mission, including how project teams integrate EJ considerations in planning studies. However, this newer policy guidance is less explicit about changes to evaluations performed under NEPA.

Executive Order 13985, issued by the Biden Administration on January 20, 2021, mandates all federal agencies to ensure their missions advance racial equity and support for underserved communities. As per the EO, "equity" means the consistent and systematic fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities that have been denied such treatment. "Underserved communities" refers to populations sharing a particular characteristic, as well as geographic communities, that have been systematically denied opportunity to participate in aspects of economic, social, and civic life.

Executive Order 14008, issued by President Biden on January 27, 2021, places the climate crisis at the forefront of foreign policy and national security planning. It directs agencies to address the disproportionately adverse health, environmental, climate related, and cumulative burdens on disadvantaged communities, as well as the accompanying economic challenges of such impacts, and deliver the benefits of their investments to disadvantaged communities such as through the Justice40 Initiative. Under Executive Order 14008, the White House directed the Council of Environmental Quality (CEQ) to develop the Climate and Economic Justice Screening Tool (CEJST).

To aid in identification of environmental justice communities, the White House Council on Environmental Quality (CEQ) developed the Climate and Economic Justice Screening Tool (CEJST). The CEJST identifies disadvantaged communities at the census tract level. Communities are identified as disadvantaged in one or more categories of criteria if the census tract is above the threshold for one or more environmental or climate indicators and the census tract is above the threshold for socioeconomic indicators. Categories assessed by the CEJST tool include climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development (White House Council on Environmental Quality, 2022).

The geographic extent of communities identified for the purpose for the EJ analysis was identified as all adjacent properties along Conneaut Creek within the 100-year floodplain of the study area (Figure 24). This area includes census tracts 420490103 and 42049010101. According to the CEJST tool, accessed on August 24, 2023, no census tracts within the study area are considered disadvantaged. These census tracts are located within Erie County, Pennsylvania and are not considered disadvantaged because they do not meet any burden thresholds or at least one associated socioeconomic threshold. As mentioned in Section 4.2,1, the population for Erie County, Pennsylvania is over 267,000 people with 86.6 percent white, 8.0 percent black or African American, 4.9 percent Hispanic or Latino, and 2.2 percent Asian. This is approximately 6 percent more white and 4.2 percent less black or African American, 3.7 percent less Hispanic or Latino, and 1.9 percent less Asian population than the averages for the Commonwealth of Pennsylvania. Within the area identified for EJ the population is 99 percent white and 1 percent Hispanic or Latino, thus any project constructed in this area would not significantly or disproportionately impact minority populations.

No Action Alternative

There would be no impact related to environmental justice associated with the No Action Alternative as there would be no federal action.

Alternatives 1, 2, 3a, & 4a

According to the CEJST tool accessed on August 24, 2023, no census tracts within the Study Area are considered disadvantaged: census tracts 420490103 and 42049010101 (Figure 24). These census tracts are located within Erie County, PA and are not considered disadvantaged because they do not meet any burden thresholds or at least one associated socioeconomic threshold.

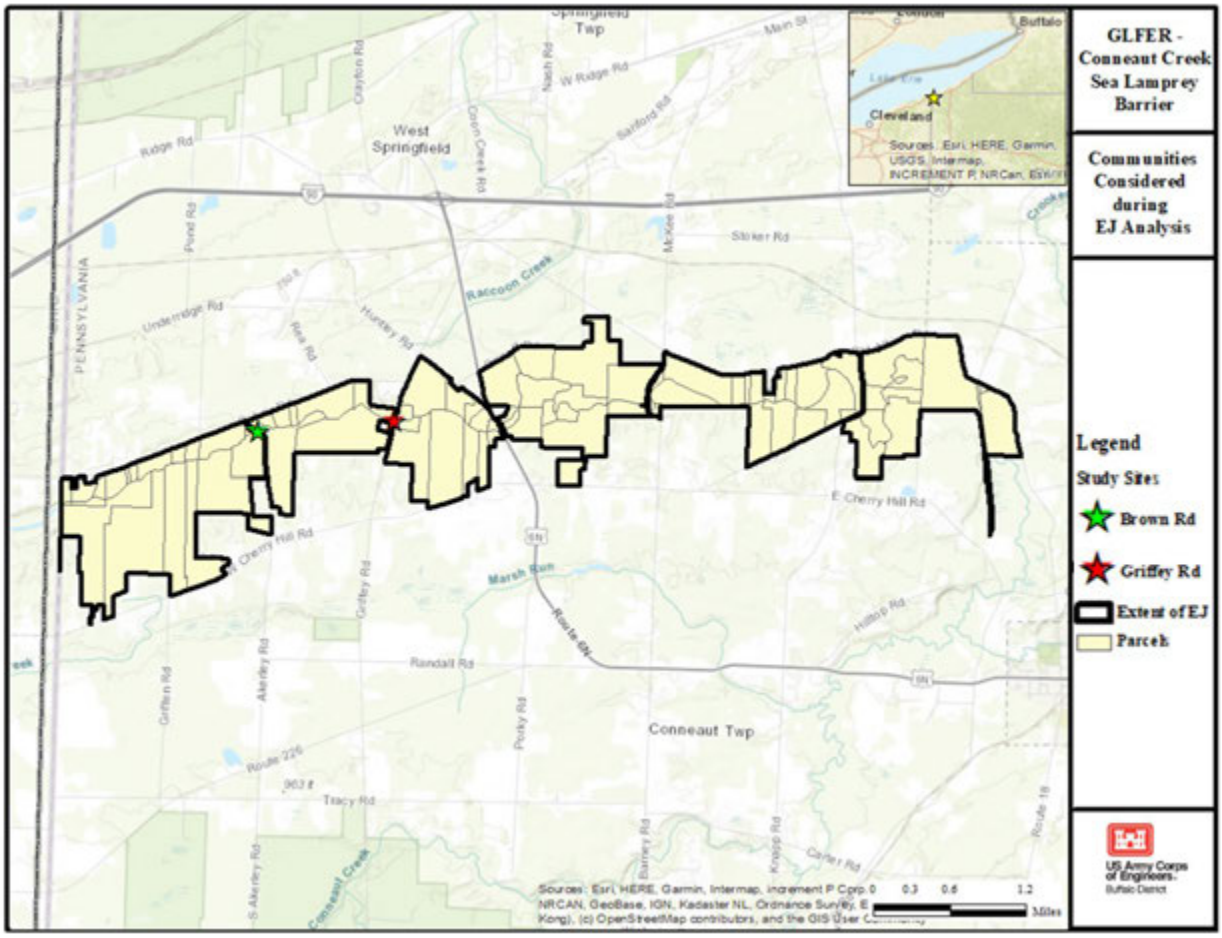


Figure 24: Geographic Extent of Communities considered during EJ Analysis.

4.2.12 Hazardous, Toxic, and/or Radioactive Waste (HTRW)

The USACE Civil Works planning policy (ER 1165-2-132) requires early identification and appropriate consideration of hazardous, toxic, and radioactive waste (HTRW) problems during a feasibility study, and it broadly defines HTRW as any material listed as a "hazardous substance" under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). The intent of the policy is to prevent expenditure of Civil Works funds to clean up contamination caused by others and spells out procedures that parallel those used in the private sector to prevent potential liability under CERCLA.

No Action Alternative

There would be no impact related to exposure of HTRW associated with the No Action Alternative as there would be no federal action.

Alternatives 1, 2, 3a, & 4a

USACE has performed a Phase I ESA in conformance with the scope and limitations of American Society for Testing and Materials (ASTM) Standard E 1527- 21 of the study area properties (Appendix A-7). This assessment revealed no evidence of recognized environmental conditions in connection with the study area. Thus, implementation of any of these alternatives would have no likely effect on any HTRW.

4.3 Physical/Natural Environmental Impacts

4.3.1 Air Quality

The USEPA set National Ambient Air Quality Standards (NAAQS) for six principal pollutants which can be harmful to public health and the environment. These pollutants include carbon monoxide, nitrogen dioxide, ozone, lead, particulate matter and sulfur dioxide. The Clean Air Act identifies two types of national ambient air quality standards. Primary standards provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. The project area is in attainment for all six principal pollutants.

No Action Alternative

There would be no air quality impact in the vicinity of the project as a result of the No Action Alternative as there would be no federal action. Existing air quality conditions would be expected to remain.

Alternatives 1, 2, 3a, & 4a

The operation of construction equipment would result in only short-term increased emissions of pollutants (e.g., suspended particulates, nitrogen dioxide, and carbon monoxide) into the local atmosphere. The release of these pollutants is not expected to result in any long- or short-term exceedance violations of state air quality standards. Erie County is in attainment based upon the 1997 standard for all pollutants (USEPA Green Book, accessed 8/24/2023). The completed project would have no long-term impact on air quality within the vicinity of the project.

4.3.2 Water Quality

Conneaut Creek is listed on the Clean Water Act Section 303(d) List of Impaired Waters requiring a total maximum daily load (TMDL) restriction or other strategy designed to improve water quality. The 2020 Water Quality Report identified aquatic life impairments for fishing (mercury) for the section of Conneaut Creek within our study area at Griffey Road (PDEP, 2020).

All the proposed action alternatives would entail the discharge of fill into a water of the United States (i.e., Conneaut Creek). Therefore, a Clean Water Act Section 401 water quality certification (WQC) would be requested from the Commonwealth of Pennsylvania for the selected alternative verifying that this discharge complies with all applicable state water quality standards. Coordination with PADEP in this regard is on-going. Refer to Section 7.1.4 for further details.

No Action Alternative

There would be no water quality impact in the vicinity of the project sites as the result of the No Action Alternative as there would be no federal action.

Alternative 1

Short-term impacts on water quality would include a temporary increase in turbidity within the construction area. There is also the potential for accidental spills of fuel, oil, and/or grease into the water during construction activities. The eventual contractor would be required to prepare a spill control plan and to implement appropriate measures in the event of a release. Such discharges, should they occur, are

expected to be short-term and of relatively low magnitude. To further minimize this effect, the eventual contractor would be required to implement best management practices and control measures to reduce any construction related impacts. These control measures may include the implementation of silt curtains, biodegradable netting, soil binders, conservation seedings, and coir or jute mats during construction to prevent erosion and sedimentation in applicable areas. After construction, the impoundment of 61.3 acres would potentially have a major detrimental impact on water quality. This would result in impacts to 22.90 acres of adjacent wetlands and result in converting 13,426.2 LF of perennial stream (Conneaut Creek) and 1,789.3 LF of unnamed intermittent streams for a total of 26.6 acres of intermittent/perennial stream, into a ponded system that could increase water temps in this area and downstream and reduce DO levels. Lastly, it would flood 11.8 acres of forested riparian uplands likely killing many trees and reducing the riparian buffer, which filters surface water from surrounding areas. This would be expected to result in increased turbidity. These detrimental impacts would not be able to be offset by the benefits associated with protecting the upstream areas from sea lamprey and reducing the periodic application of lampricides.

Alternative 2

Short-term impacts on water quality would include a temporary increase in turbidity within the construction area. There is also the potential for accidental spills of fuel, oil, and/or grease into the water during construction activities. The eventual contractor would be required to prepare a spill control plan and to implement appropriate measures in the event of a release. Such discharges, should they occur, are expected to be short-term and of relatively low magnitude. To further minimize this effect, the eventual contractor would be required to implement best management practices and control measures to reduce any construction related impacts. These control measures may include the implementation of silt curtains, biodegradable netting, soil binders, conservation seedings, and coir or jute mats during construction to prevent erosion and sedimentation in applicable areas. There would be minor impacts to adjacent wetlands due to the construction of the earthen berms that tie into high ground on either side of the stream. These impacts would be offset by the benefits of reducing passage of sea lamprey and potentially reducing the application of lampricide in upstream areas.

Alternative 3a

Short-term impacts on water quality would include a temporary increase in turbidity within the construction area. There is also the potential for accidental spills of fuel, oil, and/or grease into the water during construction activities. The eventual contractor would be required to prepare a spill control plan and to implement appropriate measures in the event of a release. Such discharges, should they occur, are expected to be short-term and of relatively low magnitude. To further minimize this effect, the eventual contractor would be required to implement best management practices and control measures to reduce any construction related impacts. These control measures may include the implementation of silt curtains, biodegradable netting, soil binders, conservation seedings, and coir or jute mats during construction to prevent erosion and sedimentation in applicable areas. After construction the permanent impoundment of 0.98 acres of wetlands, 1,486.4 LF of perennial stream and 324.5 LF of unnamed intermittent stream for a total of 2.66 acres of intermittent/perennial stream, and 0.16 acre of forested riparian uplands would potentially increase water temps and decrease DO levels in the impoundment and downstream resulting in a detrimental impact on water quality. This impact is offset by the benefits to stopping upstream movement of sea lamprey past Griffey Road and reducing the periodic application of lampricides upstream.

Alternative 4a

Short-term impacts on water quality would include a temporary increase in turbidity within the construction area. There is also the potential for accidental spills of fuel, oil, and/or grease into the water during construction activities. The eventual contractor would be required to prepare a spill control plan and to implement appropriate measures in the event of a release. Such discharges, should they occur, are expected to be short-term and of relatively low magnitude. To further minimize this effect, the eventual contractor would be required to implement best management practices and control measures to reduce any construction related impacts. These control measures may include the implementation of silt curtains, biodegradable netting, soil binders, conservation seedings, and coir or jute mats during construction to prevent erosion and sedimentation in applicable areas. After construction, the seasonal impoundment of 0.98 acres of wetlands, 1,486.4 LF of perennial stream and 324.5 LF of unnamed intermittent stream for a total of 2.66 acres of intermittent/perennial stream, and 0.16 acre of forested riparian uplands would potentially increase water temps and decrease DO levels in the impoundment area and downstream when the barrier is operational resulting in a minor temporary detrimental impact on water quality. The barrier would be operational during the lamprey spawning season (March 1 -June 30) and then lowered for the remainder of the year. Thus, the seasonal impoundment of water each year would result in a smaller detrimental impact than for Alternative 3a for water quality and would result in higher overall net benefits associated with the protection of over 513 acres of stream habitat upstream from sea lamprey and reducing the need to apply lampricides periodically to help control them. The areas upstream are currently undeveloped forested riparian areas.

4.3.3 Sediment Quality

As mentioned in Section 2.3.1, bedrock is exposed within the creek channel at the location being evaluated for a potential barrier. In Pennsylvania, this bedrock is called the Chadakoin Formation and is a Devonian Age sedimentary deposit. The Chadakoin Formation consists of medium-gray shale, light gray to brownish siltstone, fine-grained sandstone, and conglomerate, and it commonly contains marine fossils. Bedload deposits, where present above the bedrock, consist of sands and silts with a significant amount of platy cobbles. Section 2.3.3 goes on to mention that the creek in this area has a well-defined pool-riffle structure and excellent floodplain access. Preliminary bed sampling identified large, channery-like, cobble sized stones and sandy pools in addition to the exposed bedrock channel bottom. A description of the existing conditions has been added. A sediment transport model has not been developed for this project yet, but it is assumed that when the barrier is in the “up” position for 5 months it is likely to trap some of the finer sediments that normally are transported through the area due to the reduction of flow which will be resuspended when the dam is lowered especially during larger flow events.

No Action Alternative

There would be no sediment quality impacts to the vicinity of the project site as the result of the No Action Alternative since there would be no federal action.

Alternatives 1, 2, 3a, & 4a

As discussed in Section 4.2.12, overall, the preliminary HTRW screening of the study area resulted in minor recognized environmental conditions (RECs). None of these would present obstacles to construction of a sea lamprey barrier within the study area. Thus, implementation of any of these projects would have no likely effect on any HTRW. In addition, any fill brought in to construct the earthen berms would be clean fill. To further minimize any impacts, the contractor would be required to implement

best management practices and control measures to reduce any construction related impacts. These control measures may include the implementation of silt curtains, biodegradable netting, soil binders, conservation seedings, and coir or jute mats during construction to prevent erosion and sedimentation in applicable areas.

Alternative 1

Despite the fact a sediment transport model has not being developed for this area it is reasonable to assume that the fixed crest high barrier would potentially have the largest impacts to sediment transport trapping sediment behind the approximately 16 feet tall structure and potentially resulting in further erosion of areas downstream.

Alternative 2

This alternative should have no impact on sediment transport.

Alternative 3a:

The fixed crest low barrier will have some minor impacts to sediment transport as it will trap sediment initially but will come into equilibrium much sooner than the high fixed crest due it being only approximately five feet tall and thus will potentially have less impact on erosion downstream as well.

Alternative 4a:

Despite the fact that a sediment transport model has not been developed for this area it is reasonable to assume the adjustable crest low barrier will also have minor impacts to sediment transport as it will trap sediment during the four months it is operated in the "up" position, and then much, if not all, of the smaller cobbles, sand, and finer accumulated sediment will flush down during the eight months when it is lowered. This should greatly reduce the permanent impacts to sediment transport when compared to all but Alternative 2.

4.3.4 Greenhouse Gas and Climate Change

Pennsylvania has always been a leader in energy and maintains a role as an energy powerhouse, consistently being one of the top three energy production states in the nation and the top electricity exporting state. By leading in energy, Pennsylvania also leads in emissions, responsible for nearly one percent of the world's greenhouse gas (GHG) emissions (PDEP 2024). In 2020, net emissions decreased by 10.4% from 2019 levels or from 238.74 million metric tons of carbon dioxide equivalent (MMTCO2e) in 2019 to 213.94 MMTCO2e in 2020 (PDEP 2024). The sectors with the largest contribution to Pennsylvania's GHG emissions are the industrial, electricity production, and transportation sectors which accounted for 82% of all gross GHG emissions in 2020 (PADEP 2024). The declines observed in the 2020 were partly due to temporary impacts from the COVID-19 pandemic and it is expected that levels will rise as the economy rebounds despite the state having a goal to reduce statewide GHG emissions by 26% from 2005 levels by the year 2025 which they are currently on track for and an 80% reduction in statewide GHG emissions from 2005 levels by the year 2050 (PADEP 2024). Erie County, PA has one large commercial industry within that emits more than 25,000 MTCO2e that they are required to report to USEPA. The GE Transportation – Erie Plant emits 40,786 MTCO2e annually. This plant is 28 miles to the northeast of the project area and downwind from the prevailing westerly winds. Thus, it likely has no significant impact on the GHG levels of the project area, and, due to the sparsely developed nature of the project area, this location is not a significant contributor to the county or state's GHG emissions.

No Action Alternative

The No Action Alternative will have no impacts to climate change or greenhouse gases since there would be no federal action. The existing condition, with respect to this topic, would be expected to remain the same.

Alternatives 1, 2, 3a, & 4a

The proposed alternatives are not expected to have any long-term adverse impacts to greenhouse gases or climate change. Short-term emissions are expected during construction due to the operation of construction equipment.

As discussed in more detail in Section 3.7.8, a Climate Preparedness and Resiliency analysis was performed. The effects of climate change on the watershed can be both negative and positive with respect to changes in frequency and duration of flows on instream and riparian habitat.

In terms of a lamprey barrier, increases in flow would lead to the assumption that the level of protection against lamprey migration is decreased, at least in terms of flow frequency. That is, if the project was designed to the 10% ACE plus 18-inch elevation, the 10% ACE flow over time would increase and the barrier design would provide protection for an event that historically was a 10% ACE event but is now a lower frequency event. Higher and more frequent events could also mean secondary protection against lamprey (e.g., electrical) are utilized more frequently and for a longer duration. A decrease in flows would result in the project providing a higher level of protection than for which the initial was designed. Considerations of climate change on the barrier level of protection and fish passage structures will be considered in the final design of the structure.

4.3.5 Plankton and Benthos

Native Freshwater Mussels

Unionidae (commonly referred to as unionids) is the most species rich family of freshwater mussel with 674 species occurring worldwide and 297 species occurring in North America (Graf and Cummings, 2007). Historically, unionids were abundant throughout most of North America. However, overharvesting, widespread habitat destruction, pollution, land-use change, and exotic species introductions (Strayer et al., 2004) have caused approximately 70 percent of North American species to be classified as species at risk of extinction (Master et al., 2000). This group of organisms is considered one of the most threatened groups in North America.

The PFBC provided mussel abundance and distribution data within the study area and areas upstream. Two locations within the study area were surveyed in 2011 and 2018, specifically near Brown Road (RM 26.2) and the 6N Bridge crossing (RM 28.4). These four surveys returned a total of 262 live individuals and 114 fresh dead whole shells from a total of 12 different species (Table 24). Surveys conducted upstream of the study area identified similar species and abundances. No federally or state listed species were encountered during the surveys.

Mussels have a unique and distinct life cycle. Females draw in sperm that upstream males release into the water column. The specialized larvae (called glochidia) are brooded in the female's gills and eventually released to parasitize fish or mudpuppies in the case of the salamander mussel. Nearly all of Pennsylvania's mussels require a host fish for the glochidia to complete their life cycle. These hosts are critical for mussel survival and dispersal and not all fish species are capable of transforming glochidia

into juvenile mussels. Because juvenile and adult mussels spend their entire life burrowed in the sediments, unionids depend on host fish transport of glochidia for dispersal and are critical to maintaining mussel populations (Kat 1984). Different species of mussels use different species of fish and dispersal will be subject to the fish distribution range and migration. Table 24 presents the host fish species for the mussel species within the project area. Most of the mussel species present are host generalists, except for fragile papershell and kidneyshell which are relatively selective.

Human alteration to streams can disrupt mussel assemblages both upstream and downstream of a modification. Instream physical barriers can potentially affect flow and sediment transport regimes and have adverse impacts upon mussel habitat conditions. Additionally, physical barriers can adversely impact the movement of host fish that mussels rely on for development and dispersal. A sea lamprey barrier in Conneaut Creek needs to account for the sensitivities associated with sustaining the diverse and abundant mussel community present within the project area.

Table 24: Mussel abundance and diversity within the study area

Scientific Name	Common Name	Live	Fresh Dead	Host Fish Species
Alasmidonta marginata	Elktoe	10	1	Rock Bass, White Sucker, Northern Hogsucker, Warmouth, and Shorthead Redhorse
Eurynia dilatata	Spike	48	48	Rock Bass, Banded Sculpin, Gizzard Shad, Rainbow Darter, Yellow Perch, White Crappie, Black Crappie, Flathead Catfish, Sauger
Lampsilis cardium	Plain Pocketbook	27	0	Tiger Salamander, Green Sunfish, Pumpkinseed, Bluegill, Smallmouth Bass, Largemouth Bass, Yellow Perch, White Crappie, Black Crappie, Sauger, Walleye
Lampsilis siliquoidea	Fatmucket	83	1	Rock Bass, White Sucker, Florida Gar, Green Sunfish, Pumpkinseed, Warmouth, Bluegill, Longear Sunfish, Common Shiner, Smallmouth Bass, Largemouth Bass, White Bass, Sand Shiner, Tadpole Madtom, Yellow Perch, Bluntnose Minnow, White Crappie, Black Crappie, Sauger, and Walleye
Lasmigona compressa	Creek Heelsplitter	1	0	Black Bullhead, Yellow Bullhead, Slimy Sculpin, Brook Stickleback, Spotfin Shiner, Gizzard Shad, Brassy Minnow, Shortnose Gar, Green Sunfish, Orange-spotted Sunfish, Bluegill, Smallmouth Bass, Emerald Shiner, Mimic Shiner, Yellow Perch, Black Crappie, Flathead Catfish, Longnose Dace, Creek Chub
Lasmigona costata	Flutedshell	35	8	Rock Bass, Brown Bullhead, Bowfin, Central Stoneroller, Goldfish, Banded Sculpin, Common Carp, Gizzard Shad, Northern Pike, Rainbow Darter, Fantail Darter, Variegate Darter, Banded Darter, Northern Studfish, Northern Hogsucker, Green Sunfish, Pumpkinseed, Bluegill, Longear Sunfish, Smallmouth Bass, Largemouth Bass, River redhorse, Yellow Perch, Longnose Dace, Walleye, Creek Chub
Leptodea fragilis	Fragile Papershell	1	0	Freshwater Drum
Pleurobema sintoxia	Round Pigtoe	8	2	Central Stoneroller, Spotfin Shiner, Bluegill, Northern Redbelly Dace, Southern Redbelly Dace, and Bluntnose Minnow
Ptychobranchus fasciolaris	Kidneyshell	36	49	Brook Stickleback, Rainbow Darter, Fantail Darter
Pyganodon grandis	Giant Floater	0	1	Skipjack Herring, Rock Bass, Yellow Bullhead, Freshwater Drum, Central Stoneroller, River Carpsucker, Goldfish, White Sucker, Brook Stickleback, Common Carp, Gizzard Shad, Rainbow Darter, Iowa Darter, Johnny Darter, Golden Topminnow, Banded Killifish, Brook Stickleback, Longnose Gar, Green Sunfish, Pumpkinseed, Orangespotted Sunfish, Bluegill, Longear Sunfish, Striped Shiner, Common Shiner, Redfin Shiner, Pearl Dace, Largemouth Bass, White Bass, Round Goby, Golden Shiner, Blackchin Shiner, Blacknose Shiner,Yellow Perch, Bluntnose Minnow, White Crappie, Black Crappie, Blacknose Dace, Creek Chub
Strophitus undulatus	Creeper	4	0	Rock Bass, Black Bullhead, Yellow Bullhead, Central Stoneroller, Brook Stickleback, Spotfin Shiner, Rainbow Darter, Iowa Darter, Fantail Darter, Johnny Darter, Slenderhead Darter, Banded Darter, Plains Killifish, Channel Catfish, Green Sunfish, Pumpkinseed, Bluegill, Longear Sunfish, Burbot, Common Shiner, Smallmouth Bass, Largemouth Bass, River Chub, Sand Shiner, Yellow Perch, Logperch, Blackside Darter, Northern Redbelly Dace, Bluntnose Minnow, Fathead Minnow, White Crappie, Black Crappie, Blacknose Dace, Longnose Dace, Creek Chub, Walleye, and Central Mudminnow
Villosa iris	Rainbow	9	4	Mottled Sculpin, Streamline Chub, Greenside Darter, Rainbow Darter, Bluebreast Darter, Green Sunfish, Striped Shiner, Smallmouth Bass, Largemouth Bass, Yellow Perch

No Action Alternative

There would be no impact to plankton but there may be a minor detrimental impact to the benthos within the vicinity of the project site as a result of the No Action Alternative due to the continued periodic application of lampricide.

Alternative 1

During construction there will be a loss of benthic habitat in the footprint of the structure. There will also be localized destruction of some immobile and sedentary benthic organisms that reside in the bottom sediments. There will be recolonization of the face of the structure itself which will help to offset

impacts, but the large inundation area is likely to change the environment within the 61.3 acres of permanent inundation. In some cases, this change will create habitat but within the current stream areas, it is expected to result in a permanent detrimental impact and conversion to depositional sediments and benthos associated with that habitat.

Alternative 2

During construction there will be a loss of benthic habitat in the footprint of the structure. There will also be localized destruction of some immobile and sedentary benthic organisms that reside in the bottom sediments. There will be recolonization of the face of the structure itself, which will help to offset impacts. After construction the flows will be similar to preconstruction and thus recovery of the benthos to near preconstruction levels is to be expected except for the footprint of the structure.

Alternative 3a

During construction there will be a loss of benthic habitat in the footprint of the structure. There will also be localized destruction of some immobile and sedentary benthic organisms that reside in the bottom sediments. There will be recolonization of the face of the structure itself, which will help to offset impacts. There will be a minor detrimental impact within the 3.8-acre permanent inundation area with the community shifting from a lotic environment to a lentic environment with an increase in deposition and finer sediments upstream of the barrier and a change in types of benthos that dominate.

Alternative 4a

During construction there will be a loss of benthic habitat in the footprint of the structure. There will also be localized destruction of some immobile and sedentary benthic organisms that reside in the bottom sediments. There will be recolonization of the face of the structure itself which will help to offset impacts. There will be a minor detrimental impact within the 3.8-acre seasonal inundation area with the community changing from a lotic environment to a lentic environment during the barrier operation months and then when the barrier is lowered again after the sea lamprey run much of the newly deposited sediment will be eroded back to original levels. This periodic disturbance will likely cause a change in the benthos community from its current state, but less of a change than the changes anticipated with Alternative 3a.

4.3.6 Vegetation

No Action Alternative

The No Action Alternative will have no impacts to vegetation since there would be no federal action. The existing condition with respect to this topic would be expected to remain the same.

Alternative 1

During construction there will be a loss of vegetation due to clearing of trees, shrubs, and herbaceous vegetation for site access and construction of earthen berms on both sides of the creek. There will be restoration of vegetation in the access areas after construction. However, the 61.3-acre permanent inundation area upstream of the high fixed crest barrier is likely to permanently convert some of the vegetation with the existing wetlands and forested riparian corridor within this area to open water or from forested/scrub shrub areas to emergent vegetated areas, resulting in a major detrimental impact.

Alternative 2

During construction there will be a loss of vegetation due to clearing of trees, shrubs, and herbaceous vegetation for site access and construction of earthen berms on both sides of the creek. There will be restoration of vegetation in the access areas after construction. This alternative does not cause inundation; therefore, the upstream areas will remain similar to the existing condition.

Alternative 3a

During construction there will be a loss of vegetation due to clearing of trees, shrubs, and herbaceous vegetation for site access and construction of earthen berms on both sides of the creek. There will be restoration of vegetation in the access areas after construction, however, the 3.8-acre permanent inundation area upstream of the low fixed crest barrier is likely to permanently convert some of the existing wetlands and forested riparian corridor within this area to open water or from forested/scrub shrub areas to emergent vegetated areas resulting in a permanent minor detrimental impact.

Alternative 4a

During construction there will be a loss of vegetation due to clearing of trees, shrubs, and herbaceous vegetation for site access and construction of earthen berms on both sides of the creek. There will be restoration of vegetation in the access areas after construction; however, the 3.8-acre seasonal inundation area upstream of the adjustable low crest barrier is likely to permanently convert some of the existing wetlands and forested riparian corridor within this area to open water or from forested/scrub shrub areas to emergent vegetated areas resulting in a permanent minor detrimental impact. This periodic disturbance will likely cause a change in the vegetation from its current state, but less of a change than the changes anticipated with Alternative 3a.

4.3.7 Fisheries

The Conneaut Creek Watershed supports a diverse aquatic community, including at least 82 species of fish ranging from coldwater species like stocked trout and steelhead to warmwater species like muskellunge and smallmouth bass (Table 25). This fish community includes at least 8 fish species that are sensitive to lampricide treatments (spotted sucker (state threatened), warmouth (state endangered) redfin shiner (state endangered), hornyhead chub (state endangered), brindled madtom (state threatened), eastern sand darter,(state endangered), northern brook lamprey (state endangered), and brook stickleback (*Culaea inconstans*)).

Table 25: Fish Species of Conneaut Creek (Source: ODNR and PAFBC).

Scientific Name (common name)

Petromyzontidae (lamprey)
Ichthyomyzon fossor (northern brook lamprey-E)
Ichthyomyzon unicuspis (silver lamprey)
Lampetra appendix (American brook lamprey)
Petromyzon marinus (sea lamprey)

Lepisosteidae
Lepisosteus osseus (longnose gar)

Amiidae
Amia calva (bowfin)

Clupeidae
Alosa pseudoharengus (alewife)
Dorosoma cepedianum (gizzard shad)

Cyprinidae (minnows, etc.)
Campostoma anomalum (central stoneroller)
Carassius auratus (goldfish)
Clinostomus elongates (redside dace)
Cyprinella spiloptera (spotfin shiner)
Cyprinus carpio (common carp)
Cyprinus carpio x Carassius auratus (common carp x goldfish hybrid)
Luxilus chrysocephalus (striped shiner)
Luxilus chrysocephalus x Notropis rubellus (striped shiner x rosyface shiner hybrid)
Luxilus cornutus (common shiner)
Lythrurus umbratilis (redfin shiner)
Nocomis biguttatus (hornyhead chub)
Nocomis micropogon (river chub)
Notemigonus crysoleucas (golden shiner)
Notropis boops (bigeye shiner)
Notropis atherinoides (emerald shiner)
Notropis buccatus (silverjaw minnow)
Notropis hudsonius (spottail shiner)
Notropis photogenis (silver shiner)
Notropis rubellus (rosyface shiner)
Notropis stramineus (sand shiner)
Notropis volucellus (mimic shiner)
Phoxinus erythrogaster (southern redbelly dace)
Pimephales notatus (bluntnose minnow)
Pimephales promelas (fathead minnow)
Rhinichthys atratulus (blacknose dace)
Rhinichthys cataractae (longnose dace)
Semotilus atromaculatus (creek chub)

Catostomidae (suckers)
Carpiodes cyprinus (quillback)
Catostomus commersoni (white sucker)
Hypentelium nigricans (northern hogsucker)
Ictiobus bubalus (smallmouth buffalo)
Moxostoma anisurum (silver redhorse)
Moxostoma duquesnei (black redhorse)

Catostomidae (suckers) (ctd.)
Moxostoma erythrurum (golden redhorse)
Moxostroma macrolepidotum (shorthead redhorse)
Mynytrema melanops (spotted sucker)

Ictaluridae (bullhead, catfishes, madtoms)
Ameriurus melas (black bullhead)
Ameriurus natalis (yellow bullhead)
Ameiurus nebulosus (brown bullhead)
Ictalurus punctatus (channel catfish)
Noturus flavus (stonecat)
Noturus miurus (brindled madtom)

Esocidae
Esox americanus (grass pickerel)
Esox lucius (northern pike
Esox masquinongy (muskellunge)

Umbridae
Umbra limi (central mudminnow)

Osmeridae
Osmerus mordax (smelt)

Salmonidae (trout)
Oncorhynchus mykiss (rainbow trout/steelhead)

Percopsidae
Percopsis omiscomaycus (trout-perch)

Cyprinodontidae
Fundulus diaphanous (banded killifish)

Atherinidae
Labidesthes sicculus (brook silverside)

Gasterosteidae (sticklebacks)
Culaea inconstans (brook stickleback)

Cottidae (sculpins)
Cottus bairdi (mottled sculpin)

Percichthyidae
Morone americana (white perch)
Morone chrysops (white bass)

Centrarchidae (sunfish, bass)
Ambloplites rupestris (rock bass)
Lepomis cyanellus (green sunfish)
Lepomis gibbosus (pumpkinfish)
Lepomis macrochirus (bluegill)
Micropterus dolomieu (smallmouth bass)
Micropterus salmoides (largemouth bass)
Pomoxis annularis (white crappie)
Pomoxis nigromaculatus (black crappie)

Sea Lamprey

Refer to Section 1.5 for a description of sea lamprey in Conneaut Creek and the Great Lakes.

No Action Alternative

There may be a minor detrimental impact to fisheries within the vicinity of the project site as a result of the No Action Alternative due to the continued periodic application of lampricide. There was a fish kill in 2018 after a lampricide application that impacted many species of fish and raised concerns within the local community about the continued application of lampricide in Conneaut Creek for control of sea lamprey.

Alternative 1

During construction there will be a minor loss of fish habitat in the footprint of the structure. There will also be localized temporary disruption of movement of fish species within the construction area and reduced habitat quality to some increased turbidity. Such discharges, should they occur, are expected to be short-term and of relatively low magnitude. To further minimize this effect, the eventual contractor would be required to implement best management practices and control measures to reduce any construction related impacts. These control measures may include the implementation of silt curtains, biodegradable netting, soil binders, conservation seedings, and coir or jute mats during construction to prevent erosion and sedimentation in applicable areas. After construction, the impoundment of 61.3 acres would potentially have a detrimental impact on fish habitat quality immediately upstream and downstream from increased water temperatures in this impoundment area and reduced DO levels in the summer months. This structure would also impact movement of fish upstream of the barrier. A trap and sort system will be operated during the sea lamprey run (March 1-June 30) and a Denil fish ladder used to enable fish to pass the structure during the rest of the year to mitigate these impacts. However, there still will be a detrimental impact to fish movement, especially to smaller species that will not be able to utilize the Denil fish ladder as well as swifter swimming species like steelhead trout. These detrimental impacts would not be able to be offset by the benefits associated with protecting the upstream areas from sea lamprey and reducing the periodic application of lampricides.

Alternative 2

During construction there will be a minor loss of fish habitat in the footprint of the structure. There will also be localized temporary disruption of movement of fish species within the construction area and reduced habitat quality due to some increased turbidity. Such discharges, should they occur, are expected to be short-term and of relatively low magnitude. To minimize this effect, the eventual contractor would be required to implement best management practices and control measures to reduce any construction related impacts. These control measures may include the implementation of silt curtains, biodegradable netting, soil binders, conservation seedings, and coir or jute mats during construction to prevent erosion and sedimentation in applicable areas. After construction, for Alternative 2 there will be no impoundment like the other alternatives, but the seasonal operation of an electric barrier will act as a barrier to all fish movement during the sea lamprey spawning period. A trap and sort system will be operated during the sea lamprey run (March-July) to mitigate this impact. However, there still will be a minor detrimental impact to fish movement during the spring season when other sportfish and non-target species are also migrating and spawning. The effectiveness of standalone electric barriers is less than a structural barrier or combination barrier for stopping lamprey movement upstream, so there is a higher likelihood of needing to still use lampricides at times upstream to maintain control of the sea lamprey population in

Conneaut Creek. These detrimental impacts are offset by the benefits associated with protecting the upstream areas from sea lamprey and a potential reduction in the periodic application of lampricides.

Alternative 3a

During construction there will be a minor loss of fish habitat in the footprint of the structure. There will also be localized temporary disruption of movement of fish species within the construction area and reduced habitat quality due to some increased turbidity. Such discharges, should they occur, are expected to be short-term and of relatively low magnitude. To minimize this effect, the eventual contractor would be required to implement best management practices and control measures to reduce any construction related impacts. These control measures may include the implementation of silt curtains, biodegradable netting, soil binders, conservation seedings, and coir or jute mats during construction to prevent erosion and sedimentation in applicable areas. After construction the impoundment of 3.8 acres would potentially have a minor detrimental impact on habitat quality immediately upstream and downstream from increased water temperatures in this impoundment area and reduced DO levels in the summer months. This structure would also impact movement of fish upstream of the barrier. A trap and sort system will be operated during the sea lamprey run (March 1-June 30) and a slotted fish ladder used to enable fish to pass the structure during the rest of the year to mitigate these impacts. These detrimental impacts would be more than offset by the benefits associated with protecting the upstream areas from sea lamprey and reducing the periodic application of lampricides.

Alternative 4a

During construction there will be a minor loss of fish habitat in the footprint of the structure. There will also be localized temporary disruption of movement of fish species within the construction area and reduced habitat quality due to some increased turbidity. Such discharges, should they occur, are expected to be short-term and of relatively low magnitude. To minimize this effect, the eventual contractor would be required to implement best management practices and control measures to reduce any construction related impacts. These control measures may include the implementation of silt curtains, biodegradable netting, soil binders, conservation seedings, and coir or jute mats during construction to prevent erosion and sedimentation in applicable areas. After construction, the impoundment of 3.8 acres would potentially have a minor detrimental impact on habitat quality immediately upstream and downstream from increased water temperatures in this impoundment area and reduced DO levels in the summer months. This structure would also impact movement of fish upstream of the barrier. A trap and sort system will be operated during the sea lamprey run (March 1-June 30) to mitigate these impacts. There may be a temporary detrimental impact to habitat quality with the release of sediments that were trapped during the closed period in the spring when the barrier is initially lowered but these should be very short in duration. The lowered barrier should allow similar movement of all species when compared to existing conditions. The minor detrimental impacts would be more than offset by the benefits associated with protecting the upstream areas from sea lamprey and reducing the periodic application of lampricides.

4.3.8 Wetlands

Approximately 11.2 percent of the entire Conneaut Creek Watershed is covered by wetlands (i.e., 1,157.8 acres in Ohio and 12,616.2 acres in Pennsylvania). Figure 25 shows the wetlands identified in the USFWS National Wetland Inventory mapping for the Conneaut Creek Watershed. There are 468 emergent wetlands totaling approximately 627.9 acres and 2,269 forested/scrub shrub wetlands totaling 11,988.3 acres that are found in the upstream Pennsylvania portion of the watershed.

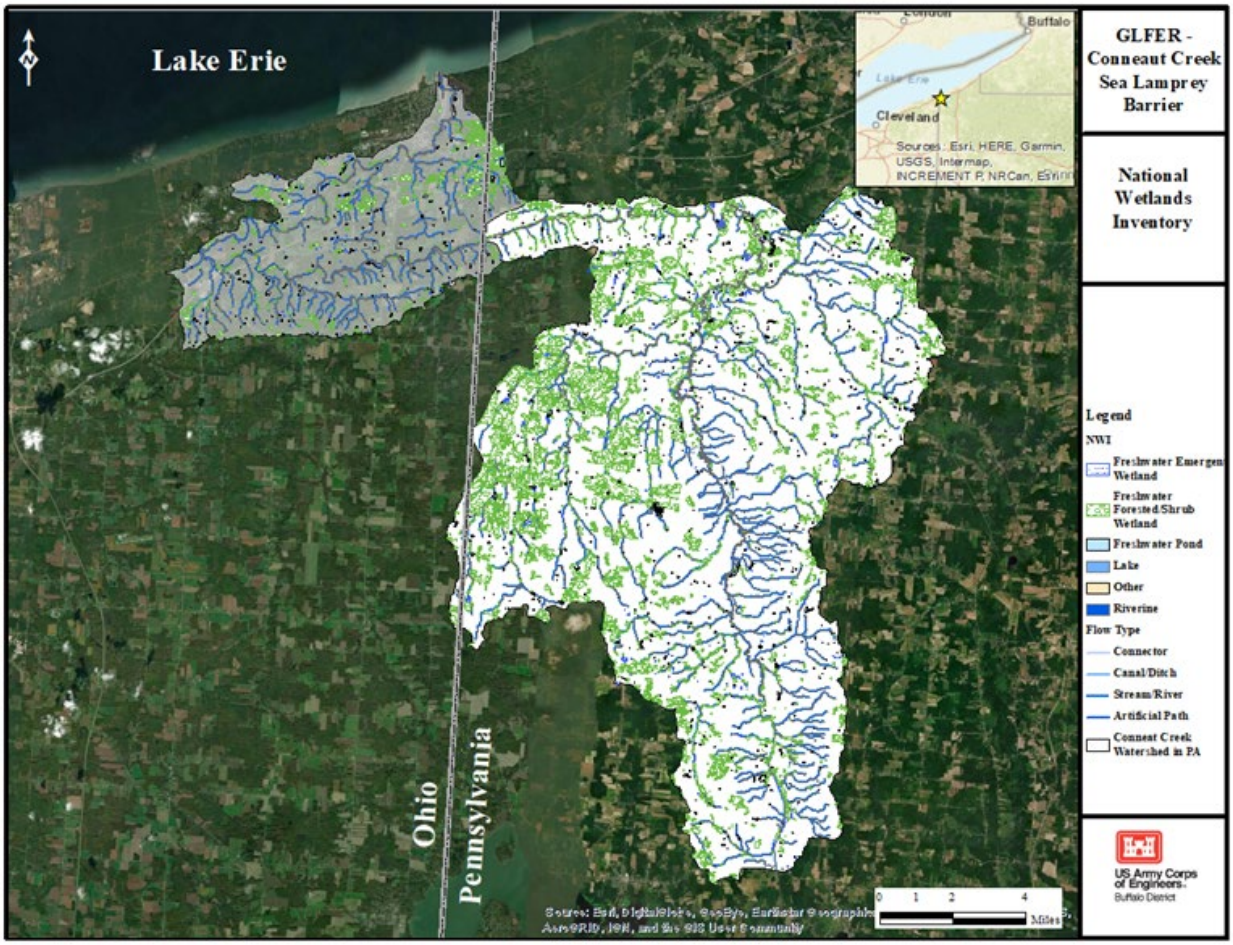


Figure 25: Conneaut Creek Watershed Wetlands Map using USFWS data.

No Action Alternative

The No Action Alternative will have no impacts to wetlands since there would be no federal action. The existing condition with respect to this topic would be expected to remain the same.

Alternative 1

During construction there will be a permanent loss of 0.03 acre of wetlands for site access and construction of the fixed crest structure and earthen berms on both sides of the creek. The 61.3-acre permanent inundation area upstream of the high fixed crest barrier is likely to permanently convert some of the existing 22.9 acres of forested scrub-shrub wetlands and forested riparian corridor within this area to open water, or from forested/scrub-shrub areas to emergent wetland areas resulting in a major detrimental impact. The benefits of the overall project will not offset the impacts to the functions and values of the wetlands impacted.

Alternative 2

During construction there will be a permanent loss of 0.03 acre of wetlands for site access and construction of the support facilities for the electric barrier and earthen berms on both sides of the creek. There will be restoration of vegetation in the access areas after construction. This alternative does not cause upstream inundation. Therefore, the upstream areas will remain similar to the existing condition.

The benefits of the overall project offset the minor detrimental impacts to the functions and values of the wetlands impacted.

Alternative 3a

During construction there will be a permanent loss of 0.03 acre of wetlands for site access and construction of the support facilities for the electric barrier and earthen berms on both sides of the creek. There will be restoration of vegetation in the access areas after construction, however, the 3.8-acre permanent inundation area upstream of the low fixed crest barrier is likely to permanently convert some of the existing 0.98 acre of forested/scrub-shrub wetlands and forested riparian corridor within this area to open water or from forested/scrub shrub areas to emergent vegetated areas resulting in a minor detrimental impact. The increase in hydrology in the inundation area will also convert adjacent areas that are currently upland to wetlands compensating for the conversion of some of the existing wetlands to open water thereby creating or restoring wetlands and mitigating the impacts to existing wetlands. This conversion of adjacent upland areas to wetlands coupled with the benefits of the overall project offset the minor detrimental impacts to the functions and values of the wetlands impacted.

Alternative 4a

During construction there will be a permanent loss of 0.03 acre of wetlands for site access and construction of the support facilities for the electric barrier and earthen berms on both sides of the creek. However, the 3.8-acre seasonal inundation area upstream of the low adjustable crest barrier is likely to permanently convert some of the existing 0.98 acre of forested scrub-shrub wetlands and forested riparian corridor within this area to open water or from forested/scrub shrub areas to emergent vegetated areas resulting in a minor detrimental impact. The increase in hydrology in the inundation area will also convert adjacent areas that are currently upland to wetlands, compensating for the conversion of some of the existing wetlands to open water and thereby creating or restoring wetlands and mitigating the impacts to existing wetlands. This periodic disturbance will likely cause a change in the vegetation from its current composition, but less of a change than those anticipated with Alternative 3a. This conversion of adjacent upland areas to wetlands coupled with the benefits of the overall project offset the minor detrimental impacts to the functions and values of the wetlands impacted and, in this case, have the greatest number of net benefits of any alternative.

4.3.9 Streams and Floodplain

The Conneaut Creek Watershed is the largest sub-watershed within Pennsylvania's portion of the Great Lakes Basin and occupies portions of Erie and Crawford Counties in Pennsylvania and Ashtabula County, Ohio. The entire watershed, including the portion in Ohio, encompasses 191 square miles while the Pennsylvania portion of the watershed represents approximately 153 square miles. The watershed is composed of 13 discrete sub-watersheds, 13 named streams, and 268 discrete mapped stream segments (Campbell et al. 2010). The largest sub-watershed is the mainstem of Conneaut Creek, which encompasses 66.8 square miles, followed by Temple Creek (15.4 mi^2) and the west branch of Conneaut Creek (11.1 mi^2).

The largest flood of record on Conneaut Creek occurred on January 22, 1959, where 17,000 cubic feet per second (cfs) was recorded at the Conneaut Creek gage with a resulting gage height of 11.7 feet. This event can be described as larger than the 1% ACE today. However, this gage height was only the second highest on record; a gage height of 12.94 feet was recorded on March 04, 1934. It is noted that this height was affected by backwater, presumably from a very high lake stage at Lake Erie.

A FEMA Flood Insurance Study was conducted for the City of Conneaut with a Flood Insurance Rate Map illustrating the Zone AE floodplain. A floodplain marked as "Zone AE" denotes a detailed hydraulic study has been performed to determine the 1% ACE floodplain and floodway along with 0.2% ACE floodplain. Upstream of this study, the majority of the floodplain within the watershed is marked as "Zone A" as no detailed studies have been performed and the 1% ACE floodplain is determined using approximate methods. Other small portions of Conneaut Creek with Zone AE delineated are the communities of Springboro and Conneautville. Figure 26 shows the FEMA 1% ACE floodplain within Conneaut Creek.

Since the floodplain is a FEMA Zone A and no detailed study has been performed, the modeled 1% ACE floodplain is the effective existing conditions floodplain that will be used to determine FEMA flood insurance implications associated with construction of the project. Figure 27 shows the existing conditions modeled 1% ACE floodplain within the study reach.

Given the largely undeveloped watershed and floodplain, significant damages from extreme storm events on Conneaut Creek are unlikely. Large portions of Conneaut Creek are contained within the steep carved out valley, containing all the flood flow in a relatively narrow floodplain. The likelihood of flood impacts increases upstream, where the channel slope decreases and the floodplain widens. Farm fields and even a few dwellings are visible within the FEMA Zone A floodplain in the upper reaches. In addition to the increased flooding hazard from high lake levels, reports for potential ice jam flooding at bridges in the City of Conneaut have also been issued. Due to the degree of forested floodplain, floatable debris jams at bridges could also be a flooding hazard within the watershed.

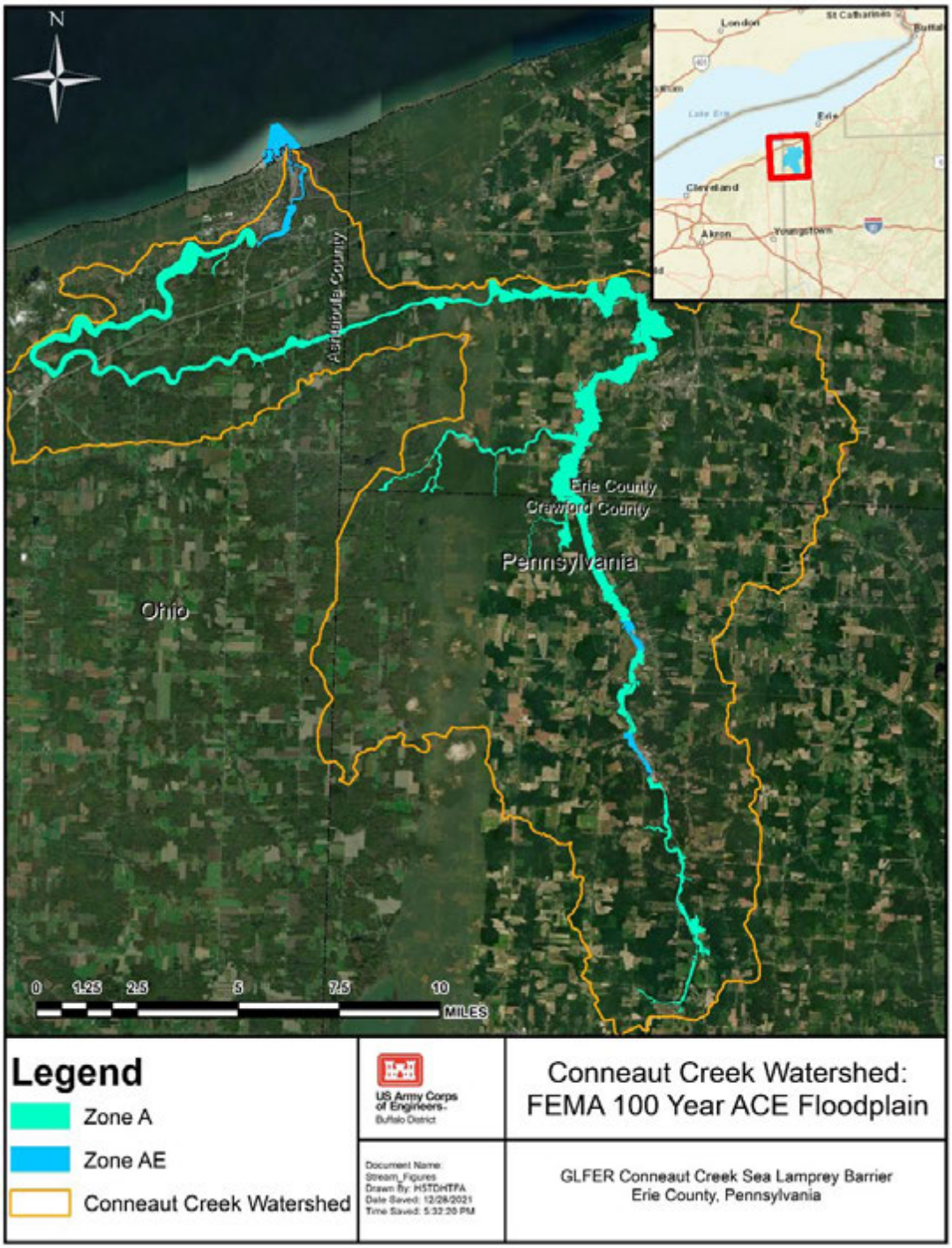


Figure 26: FEMA 1% ACE floodplain zones along Conneaut Creek.

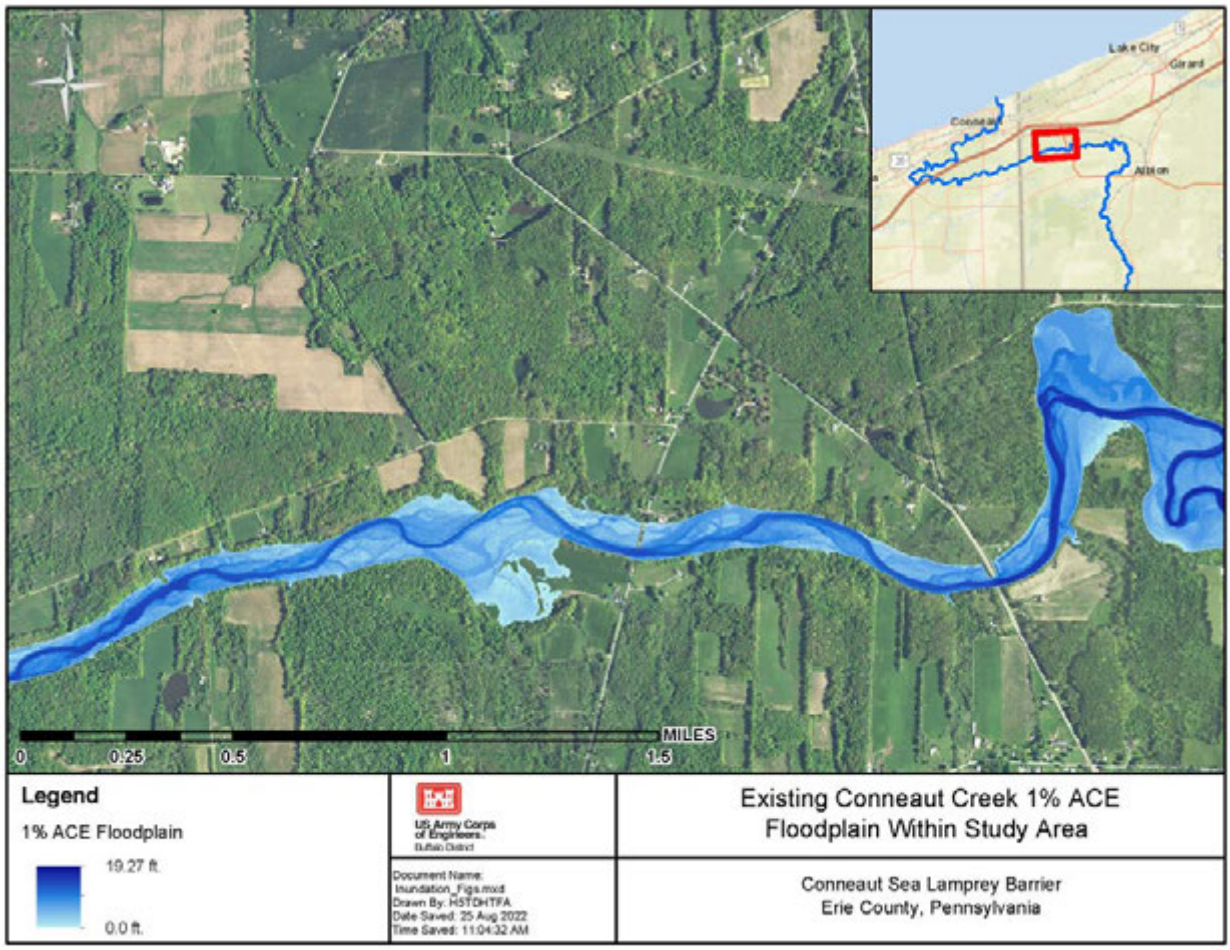


Figure 27: Existing Conditions 1% ACE Floodplain Within Study Area.

No Action Alternative

There may be a minor detrimental impact to the stream quality for species that are sensitive to the continued application of lampricide but these applications will have no impact to the surrounding floodplain areas.

Alternative 1

During construction there will be a permanent loss of 0.03 acre of wetlands for site access and construction of the structure and earthen berms on both sides of the creek. The 61.3-acre permanent inundation area upstream of the high fixed crest barrier is likely to permanently convert some of the existing 22.9 acres of forested scrub-shrub wetlands, 13,426.2 LF of perennial stream and 1,789.3 LF of unnamed intermittent streams for a total of 26.6 acres of intermittent/perennial stream, and 11.8 acres of forested riparian corridor within this area to open water or from forested/scrub-shrub areas to emergent wetland areas resulting in a detrimental impact to existing stream and floodplain habitat. This impoundment would likely be beneficial to some migratory birds, including waterfowl and would block sea lamprey from 50 miles of suitable spawning habitat. Benefits of the overall project would not be expected to offset the impacts to stream and floodplain values.

Alternative 2

During construction there will be a permanent loss of 0.03 acre of wetlands and 0.05 acres of perennial stream for site access and construction of the structure and earthen berms on both sides of the creek. As a standard practice, the contractor would be required to keep their activities under surveillance, management, and control to minimize interference with, or damage to, local fish and wildlife. This may include in water work windows to avoid sensitive times that native species are using the area. This structure does not impound any water and thus would have only a minimal seasonal impact, if any, on stream or floodplain values; and thus, these impacts would be offset by overall benefits of the project.

Alternative 3a

During construction there will be a permanent loss of 0.03 acre of wetlands and 0.05 acres of perennial stream for site access and construction of the structure and earthen berms on both sides of the creek. As a standard practice, the contractor would be required to keep their activities under surveillance, management, and control to minimize interference with, or damage to, local fish and wildlife. This may include in water work windows to avoid sensitive times that native species are using the area. The 3.8-acre permanent inundation area upstream of the low fixed crest barrier is likely to permanently convert some of the existing 0.98 acres of forested scrub-shrub wetlands, 1,489.4 LF of perennial stream and 324.5 LF of unnamed intermittent stream for a total of 2.66 acres of intermittent/perennial stream, and 0.16 acres of forested riparian corridor within this area to open water or from forested/scrub-shrub areas to emergent wetland areas resulting in a minor detrimental impact to existing stream and floodplain habitat. The structure will not result in flooding of any structures upstream or downstream at the 1% ACE storm. The benefits of the overall project are expected to more than offset these impacts to stream and floodplain values.

Alternative 4a

During construction there will be a permanent loss of 0.03 acre of wetlands and 0.05 acres of perennial stream for site access and construction of the structure and earthen berms on both sides of the creek. As a standard practice, the contractor would be required to keep their activities under surveillance, management, and control to minimize interference with, or damage to local fish and wildlife. This may include in water work windows to avoid sensitive times that native species are using the area. The 3.8-acre seasonal inundation area upstream of the adjustable low crest barrier is likely to permanently convert some of the existing 0.98 acres of forested scrub-shrub wetlands, 1,489.4 LF of perennial stream (Conneaut Creek) and 324.5 LF of unnamed intermittent stream for a total of 2.66 acres of intermittent/perennial stream, and 0.16 acres of forested riparian corridor within this area to open water or from forested/scrub-shrub areas to emergent wetland areas resulting in a minor detrimental impact to existing wildlife habitat. The barrier would be operational during the lamprey spawning season (March 1 -June 30) and then lowered for the remainder of the year. Thus, the seasonal impoundment of water each year would result in a smaller detrimental impact to wildlife values than for Alternative 3a. It would result in higher overall net benefits associated with the protection of over 513 acres of stream habitat upstream of the barrier and the reduced need to apply lampricides in the watershed periodically to help control them.

4.3.10 Wildlife

No Action Alternative

There may be a minor detrimental impact to the wildlife [i.e., amphibians including the common mudpuppy (*Necturus maculosus*)] within the vicinity of the project site as a result of the No Action Alternative due to the continued periodic application of lampricide.

Alternative 1

Wildlife species (i.e., amphibians, reptiles, mammals, and birds) would temporarily avoid these areas during construction but would be expected to return soon after construction activities have ceased. As a standard practice, the contractor would be required to keep their activities under surveillance, management, and control to minimize interference with, or damage to local wildlife.

During construction there will be a permanent loss of 0.03 acre of wetlands for site access and construction of the structure and earthen berms on both sides of the creek. The 61.3-acre permanent inundation area upstream of the high fixed crest barrier is likely to permanently convert some of the existing 22.9 acres of forested scrub-shrub wetlands, 13,426.2 LF of perennial stream (Conneaut Creek) and 1,789.3 LF of unnamed intermittent streams for a total of 26.6 acres of intermittent/perennial stream, and 11.8 acres of forested riparian corridor within this area to open water or from forested/scrub-shrub areas to emergent wetland areas resulting in a detrimental impact to existing wildlife habitat. This impoundment would likely be beneficial to some migratory birds, including waterfowl. The benefits of the overall project would not be expected to offset the impacts to wildlife values.

Alternative 2

Wildlife species (i.e., amphibians, reptiles, mammals, and birds) would temporarily avoid these areas during construction but would be expected to return soon after construction activities have ceased. As a standard practice, the contractor would be required to keep their activities under surveillance, management, and control to minimize interference with, or damage to local wildlife. This structure does not impound any water and thus would have only a minimal seasonal impact, if any, on wildlife values.

Alternative 3a

Wildlife species (i.e., amphibians, reptiles, mammals, and birds) would temporarily avoid these areas during construction but would be expected to return soon after construction activities have ceased. As a standard practice, the contractor would be required to keep their activities under surveillance, management, and control to minimize interference with, or damage to, local wildlife.

During construction there will be a permanent loss of 0.03 acre of wetlands for site access and construction of the structure and earthen berms on both sides of the creek. The 3.8-acre permanent inundation area upstream of the low fixed crest barrier is likely to permanently convert some of the existing 0.98 acres of forested scrub-shrub wetlands, 1,489.4 LF of perennial stream (Conneaut Creek) and 324.5 LF of unnamed intermittent stream for a total of 2.66 acres of intermittent/perennial stream, and 0.16 acres of forested riparian corridor within this area to open water or from forested/scrub-shrub areas to emergent wetland areas resulting in a minor detrimental impact to existing wildlife habitat. This impoundment would likely be beneficial to some migratory birds, including waterfowl. The benefits of the overall project are expected to offset these impacts to wildlife values.

Alternative 4a

Wildlife species (i.e., amphibians, reptiles, mammals, and birds) would temporarily avoid these areas during construction but would be expected to return soon after construction activities have ceased. As a standard practice, the contractor would be required to keep their activities under surveillance, management, and control to minimize interference with, or damage to, local wildlife.

During construction there will be a permanent loss of 0.03 acre of wetlands for site access and construction of the structure and earthen berms on both sides of the creek. The 3.8-acre seasonal inundation area upstream of the adjustable low crest barrier is likely to permanently convert some of the existing 0.98 acres of forested scrub-shrub wetlands, 1,489.4 LF of perennial stream (Conneaut Creek) and 324.5 LF of unnamed intermittent stream for a total of 2.66 acres of intermittent/perennial stream, and 0.16 acres of forested riparian corridor within this area to open water or from forested/scrub-shrub areas to emergent wetland areas resulting in a minor detrimental impact to existing wildlife habitat. The barrier would be operational during the lamprey spawning season (March 1 -June 30) and then lowered for the remainder of the year. Thus, the seasonal impoundment of water each year would result in a smaller detrimental impact to wildlife values than for Alternative 3a. It would result in higher overall net benefits associated with the protection of over 513 acres of stream habitat upstream of the barrier and the reduced need to apply lampricides in the watershed periodically to help control them.

4.3.11 Threatened and Endangered (T&E) Species

The USFWS indicates that there is one federally threatened species, two federally endangered species, and two proposed endangered species listed as being present in the Conneaut Creek Watershed (Table 26). The tricolored bat and salamander mussel are not currently listed but are likely to be listed prior to the construction of any project and will therefore need to be coordinated with USFWS under Section 7 of the Endangered Species Act (ESA). The bald eagle is also identified as occurring within the watershed, although it is no longer listed on the endangered species list. It is, however, protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668) and is further protected by Pennsylvania Game and Wildlife Code.

Table 26: Federally Listed Species in the Pennsylvania portion of Conneaut Creek Watershed.

Scientific Name	Common Name	Status
Indiana Bat	*Myotis sodalis*	Endangered
Northern Long-eared Bat	*Myotis septentrionalis*	Endangered
Tricolored Bat	*Perimyotis subflavus*	Proposed Endangered
Red Knot	*Calidris canutus rufa*	Threatened
Salamander mussel	*Simpsonaias ambigua*	Proposed Endangered

The study area is found within the Conneaut Creek Natural Heritage Area which contains at least 12 freshwater mussels and five mussel species of state concern (Figure 28). Populations of these species are scattered in numerous locations along the length of the core habitat. The floodplain of Conneaut Creek is known to contain Shumard's Oak (*Quercus shumardii*) which is state endangered. The adjacent floodplain wetlands may also contain plants such as Virginia blue flag (*Iris virginica*; state endangered), small beggar ticks (*Bidens discoidea*; state rare), and pineland pimpernel (*Samolus parviflorus*; state rare). Further coordination is being conducted with the USFWS, PFBC, and Pennsylvania Natural Heritage Program to ensure impacts to these species within the project area are avoided and/or minimized. This

may include surveys to identify the presence of such species within the project area, such as habitat surveys, additional mussel surveys, and possibly a mist net survey.

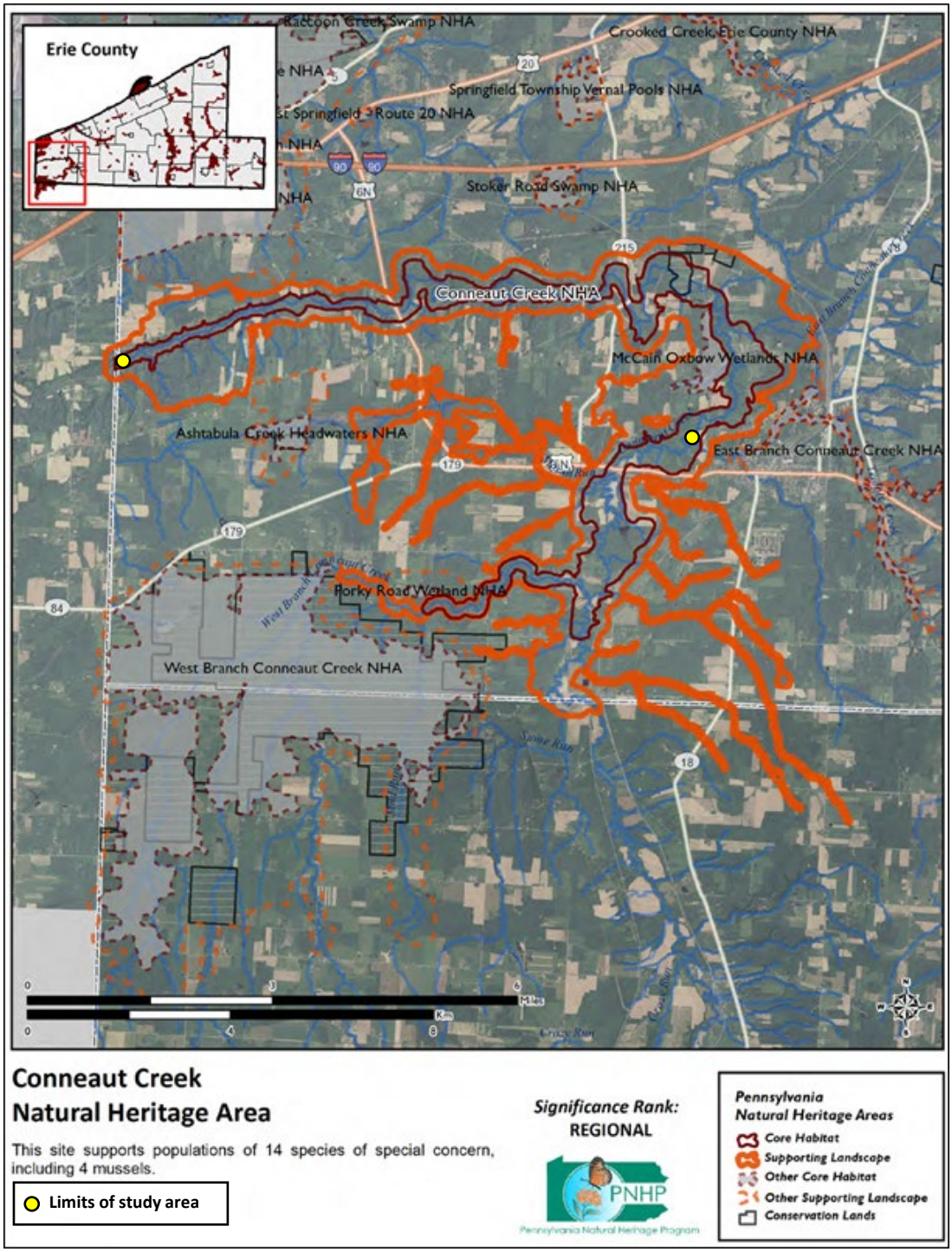


Figure 28: Map of Conneaut Creek Natural Heritage Area (PNHP).

No Action Alternative

Based on the Biological Assessment for the application of TFM in Conneaut Creek (Pennsylvania) (USFWS 2023), there would be minor detrimental impacts to threatened and endangered species as the result of the No Action Alternative, which includes lampricide treatments.

Alternatives 1, 2, 3a, & 4a

The purpose of the ESA of 1973 is to provide a means whereby the ecosystems upon which T&E species depend may be conserved or protected, and to provide a program for the conservation of such species. The proposed project alternatives are located within the range of the federal T&E species listed below. Following each species is the USACE determination of effect that any of these four project alternatives are expected to have on them:

- Red knot – Threatened. Suitable habitat consists of dry tundra areas with sparsely vegetated hillsides for breeding, and intertidal, marine habitats, especially near coastal inlets, estuaries, and bays. Further, red knots need to encounter these favorable habitat, food, and weather conditions within narrow seasonal windows as the birds travel along migratory stopovers between wintering and breeding areas.

  USACE Effects Determination: The Griffey Road area for the alternatives considered do not contain suitable habitat for this species. Therefore, the proposed project would have no effect on the red knot.

- Indiana bat – Endangered. The Indiana bat annual life cycle includes four major phases: 1) winter hibernation, 2) spring migration, 3) a summer maternity period, and 4) fall migration/swarming. In general, this species hibernates from October through April, depending upon local weather conditions. They form large, single-layer clusters on cave ceilings in densities ranging from 300-500 bats/square foot.

  After hibernation ends in late March or early April, they migrate to summer roosts. Summering bats typically day roost under exfoliating bark of trees in riparian, bottomland, and upland forests. Roost trees are most often snags. However, live shaggy bark trees such as hickory, ash, oak, elm, pine, hemlock, and others, are also used. It appears that roost trees are chosen based on structure, rather than species.

  The bats forage in forested stream corridors, upland and bottomland forests, and over impounded bodies of water. They tend to avoid vast open spaces, so wooded corridors linking roosting sites with foraging areas are important in areas where forests are fragmented. Indiana bats generally do not show preference to particular tree species, but rather prefer to roost in trees that provide suitable roosting features, such as crevices and exfoliating bark.

  USACE Effects Determination: All alternatives may involve the cutting of trees during the construction phase for site access and construction of earthen berms on both sides of the creek. Any tree removal would be done during the tree clearing window set for the Indiana bat. The tree removal dates for the Indiana Bat are from October 15 to March 31. The inundation areas upstream for Alternatives 1, 3a, and 4a, may result in impacts to forested corridor causing more dead standing trees with exfoliating bark in these areas than existing conditions. Therefore, the project alternatives may affect, but are not likely to adversely affect, the Indiana bat.

- Northern long-eared bat – Endangered. Northern long-eared bat is a small-sized insectivorous bat

widely distributed in the eastern United States and across Canada.

Summer Habitat (April-August): In general, this species uses a variety of structures for roosting habitat, such as live and dead trees with cracked and exfoliating bark, broken limbs, cavities, and also man-made structures. However, they more often roost in crevices or cavities of tress than under exfoliating bark. Maternity colonies (adult females) use cracks, cavities, and beneath the bark of dead and living trees. Males are solitary and do not roost with maternity colonies. The bat forages under the forest canopy, at small ponds or streams, along paths and roads, or at the forest edge.

Swarming Habitat (August-September): Prior to hibernation, the bat uses the habitat around and within the hibernacula.

Winter Habitat (October-March): The bat hibernates in caves or abandoned mines.

USACE Effects Determination: All alternatives may involve the cutting of trees during the construction phase for site access and construction of earthen berms on both sides of the creek. The inundation areas upstream for Alternatives 1, 3a, and 4a, may result in impacts to forested corridor causing more dead standing trees with exfoliating bark in these areas than existing conditions. Therefore, the proposed project may affect, but is not likely to adversely affect, the northern long-eared bat. This effect would be mitigated due to adherence to the tree clearing windows specific to the northern long-eared bat. Tree removal activities will not be conducted within 150 feet of a known occupied maternity roost tree during the pup season (June 1 to July 31).

- Bald eagle. Bald eagles are no longer protected under the federal Endangered Species Act and Section 7 consultation with the USFWS is no longer necessary. However, bald eagles remain protected under the Bald and Golden Eagle Protection Act.

  USACE Effects Determination: The proposed project involves the creation of a sea lamprey barrier. The features associated with this alternative will have no effect on the bald eagle. There are no known nesting areas in close proximity of the proposed project.

- Tricolored Bat – Proposed Endangered. Tricolored bats are not protected under the federal Endangered Species Act and Section 7 consultation with the USFWS is not necessary yet. It is possible that this species will be listed prior to completion of construction and thus require coordination at that time. In the interim, it is assumed that this bat will have similar protections with tree cutting windows as Indiana bat and northern long-eared bats. Thus, a preliminary effects determination is listed below for informational purposes only at this point.

  Summer Habitat (April-September): In general, this species is found in forested habitats where they roost in trees, primarily among leaves of live or recently dead deciduous hardwood trees, but may also be found in pine trees, and occasionally human structures.

  Winter Habitat (October-March): The bat hibernates in caves or abandoned mines.

  USACE Effects Determination: All alternatives may involve the cutting of trees during the construction phase for site access and construction of earthen berms on both sides of the creek. Any tree removal would be between October 15 to March 31. The inundation areas upstream for Alternatives 1, 3a, and 4a, may result in impacts to forested corridor causing more dead standing trees with exfoliating bark in these areas than existing conditions. Therefore, the project

alternatives may affect, but are not likely to adversely affect, the tricolored bat if and when it does become listed and fully protected by the Endangered Species Act. If this species becomes listed prior to a project going to construction, further coordination will be completed with the USFWS.

- Salamander mussel – Proposed Endangered. Salamander mussels are not protected under the federal ESA and Section 7 consultation with the USFWS is not necessary at this time. It is possible that this species will be listed prior to completion of construction and thus require coordination at that time. In the interim, informal consultation will be performed with USFWS to determine the potential impacts to salamander mussel and to ensure all necessary coordination is performed prior to construction of any barrier.

  The salamander mussel is a small, thin-shelled mussel that inhabits swift-flowing rivers and streams with areas of shelter under rocks or in crevices. The USFWS announced on August 22, 2023 that they are proposing to list the salamander mussel as endangered under the ESA. They identified several primary threats including contaminants, changes in water flow, landscape alteration, invasive species and risks to the salamander mussel's host species, the mudpuppy, which plays a vital role in the mussel's life cycle.

  The USFWS is also proposing critical habitat for the species. Critical habitat is an area that contains habitat features that are essential for the survival and recovery of a listed species. The areas currently proposed as critical habitat for salamander mussels include Conneaut Creek: 62 river miles in Ashtabula County in Ohio and Erie and Crawford counties in Pennsylvania. This includes the current proposed barrier location at Griffey Road in Conneaut Creek.

  Detailed surveys conducted by PADEP and PFBC have not identified salamander mussels within the reach of stream near Griffey Road. One of the contaminants listed as impacting salamander mussels is lampricide. Not only is the mussel sensitive to lampricide treatments but it's primary host species, the common mudpuppy is as well. This proposed project would reduce or eliminate the application of lampricide over approximately 50 miles of stream upstream of Griffey Road with much of that being within this proposed critical habitat for salamander mussels. Thus, despite this project potentially impacting some of the proposed critical habitat during construction and seasonal inundation, the project would protect a much larger portion of this critical habitat from lampricide application. Coordination with USFWS and state and local agencies with regard to this issue is on-going.

  USACE Effects Determination: All alternatives may involve minor impacts to the proposed salamander mussel critical habitat during construction. The inundation areas upstream for Alternatives 1, 3a, and 4a, may result in varying degrees of impacts to proposed critical habitat due to the amounts of inundation and duration. However, these may have significantly less impacts overall than continued application of lampricide and thus be a preferred method for sea lamprey control. Therefore, there is a higher probability that the project alternatives may affect, but are not likely to adversely affect, the salamander mussel if and when it does become listed and fully protected by the Endangered Species Act. If this species becomes listed prior to a project going to construction, further coordination will be completed with the USFWS.

The above effects determinations, without the tricolored bat and salamander mussel determinations, will be submitted to the USFWS for its concurrence. Informal consultation is on-going for at least the salamander mussel due to the higher potential for the project alternatives to impact this species.

Section 5 Plan Comparison and Selection

5.1 Plan Comparison

Alternative plans were compared based on performance in the evaluations described in Section 3.7. As evidenced by the ecological benefits analysis and the CE/ICA results, Alternative 1 is not a cost-effective plan, but Alternatives 2, 3a, and 4a are cost-effective. Alternative 4a is considered a "best buy" plan.

Of the cost-effective plans, Alternative 4a is most effective in achieving planning objectives while avoiding constraints, to the extent feasible. The adjustable fixed crest barrier proposed in Alternative 4a is an effective barrier during the sea lamprey migration season, but the barrier can also be lowered upon conclusion of the sea lamprey migration season to restore fish passage to natural conditions. Alternative 4a requires implementation of a secondary electric barrier, which may impact public safety. However, the electric barrier would only be active during high flow events during which flow is anticipated to pass over the top of the seasonal barrier. Preliminary safety measures for each plan alternative under consideration are described in 4.2.8. During the detailed design phase, a final safety plan will be developed for any recommended plan in which the electric barrier is proposed.

Evaluation of each alternative against the systems of accounts indicated minimal differences between the benefits categorized in the NED, RED, and OSE accounts for each plan. Of the system of accounts, the EQ account is, therefore, the primary driver of plan selection. Alternative 4a provides the greatest increase in habitat units without significant environmental impacts. Alternative 4a reasonably maximizes benefits for the EQ account while providing similar benefits for the NED, RED, and OSE accounts as Alternatives 2 and 3a.

Finally, each alternative was evaluated based on its ability to satisfy the P&G criteria of completeness, effectiveness, efficiency, and acceptability. While Alternatives 2 and 3a satisfied each of the P&G criteria to some degree, Alternative 4a is the only alternative that fully satisfies each of the four criteria.

5.2 Identification of the NER Plan

The NED Plan is defined in ER 1105-2-100 as the alternative plan that reasonably maximizes net economic benefits consistent with protecting the Nation's environment. For ecosystem restoration projects, USACE policy does not require identification or recommendation of the NED Plan.

Unless a deviation is requested from the non-federal sponsor, USACE policy requires recommendation of the NER Plan for ecosystem restoration projects. The NER Plan is defined as the alternative plan that reasonably maximizes ecosystem restoration benefits compared to costs, consistent with the federal objective. The NER Plan must be shown to be cost-effective.

Alternative 4a is identified as the NER Plan as it is alternative that maximizes ecosystem benefits by returning 160 AAHUs of net ecological benefits. As demonstrated by the CE/ICA, Alternative 4a is a best buy plan and provides the greatest ecological benefit at the lowest incremental cost. Refer to Section 3.7 for full details of these analyses.

5.3 Plan Selection

Selection of the recommended plan requires careful consideration of the plan that meets planning objectives, avoids planning constraints, and reasonably maximizes environmental benefits while passing tests of cost effectiveness and incremental cost analyses, significance of outputs, acceptability,

completeness, efficiency, and effectiveness. Based on the analyses conducted for this study, Alternative 4a is the recommended plan. Alternative 4a consists of the adjustable fixed crest barrier and electrical barrier to prohibit sea lamprey migration, the trap and sort system and jumping pool to pass native species, and the portage to mitigate for the impacts of the barrier to recreational use of Conneaut Creek. Alternative 4a provides the greatest ecological benefit at the lowest incremental cost, providing approximately 160 AAHUs for an estimated construction cost of $6,076,000. Alternative 4a is the NER plan.

Section 6 The Recommended Plan

6.1 Plan Accomplishments

It is recommended that a seasonally operated adjustable low crest barrier that uses an Obermeyer gate (adjustable crest barrier) and electrical barrier with trap and sort and jumping pool (Alternative 4a) at Griffey Road be chosen to provide more efficient and effective means to prevent or significantly reduce the numbers of sea lamprey from reaching spawning habitat in Conneaut Creek. This alternative was identified as the best buy alternative and returned the greatest average annual habitat units by balancing need for an effective sea lamprey barrier while minimizing impacts to the natural system. Additionally, Alternative 4a ranked highest in terms of the four evaluation criteria USACE uses to screen alternative plans (i.e., acceptability, completeness, effectiveness, and efficiency).

Alternative 4a will effectively limit sea lamprey migration into Conneaut Creek upstream of the barrier, thereby reducing or eliminating the need for lampricide treatments. Reductions in the use of lampricide will protect native species from potential impacts of this chemical while still protecting the Lake Erie fishery from negative impacts associated with sea lamprey invasion. Furthermore, implementation of a barrier on Conneaut Creek will protect the East Branch of Conneaut Creek from sea lamprey invasion should the Bessemer Dam fail. This protection will also benefit the northern brook lamprey population in the East Branch by preventing the need for TFM application in the tributary.

Alternative 4a will also result in positive economic impacts to the Great Lakes Region. By eliminating the need for lampricide treatments in Conneaut Creek, Alternative 4a will result in a cost savings for USFWS, who currently treats Conneaut Creek with lampricide every two to five years. Reduction of the sea lamprey population and associated impacts on fish species will result in positive benefits to commercial fishing, including recreational and sport fishing.

Compared to other alternatives, Alternative 4a also effectively limits sea lamprey migration while minimizing impacts to property owners along Conneaut Creek. Alternative 4a utilizes a seasonally operated low crest barrier to limit sea lamprey migration. The low crest height minimizes upstream inundation and avoids creation of a life safety risk that may result from taller barriers. Seasonal operation of Alternative 4a also allows the barrier to be lowered to the streambed outside of the sea lamprey migration season, returning Conneaut Creek to uninhibited flow conditions. When the barrier is lowered, associated inundation on upstream properties will return to preconstruction conditions. As such, Alternative 4a maximizes ecological benefits while minimizing burdens to upstream property owners.

6.2 Plan Components

The site selected for the sea lamprey barrier is the Griffey Road location just downstream of the bridge over Conneaut Creek (Figure 29). This location has a shale creek bottom that is expected to be excavatable by typical construction equipment. The project area is underlain by the Devonian age Chadakoin Formation, which is composed of siltstone and some sandstone, interbedded with shale (refer to Appendix A-3 for full details). Geotechnical borings performed by PADOT in 1948 were extended to refusal in bedrock likely composed of limestone or siltstone, both competent bedrock for the barrier foundation. Further investigations related to the soil and rock on site will be conducted during the detailed design phase for this project.

As proposed, the barrier would tie into the existing Griffey Road bridge abutment and embankment on the right bank (refer to Appendix A-1 for full details). The existing bridge abutment and embankment, along

with the adjustable barrier, would serve to impound water to achieve a difference in upstream and downstream water levels. The PADOT will need to approve such use of these structures and an engineering evaluation will be needed to ensure that water levels will not be negatively impacted.

The site is accessible from the right side bank from property owned by the Commonwealth of Pennsylvania. This allows for permanent access to one side of the barrier. The left side bank is owned by an individual who is amenable to the project. These factors, along with the hydrology discussed in Appendix A-2, make this the most feasible site for the lamprey barrier.

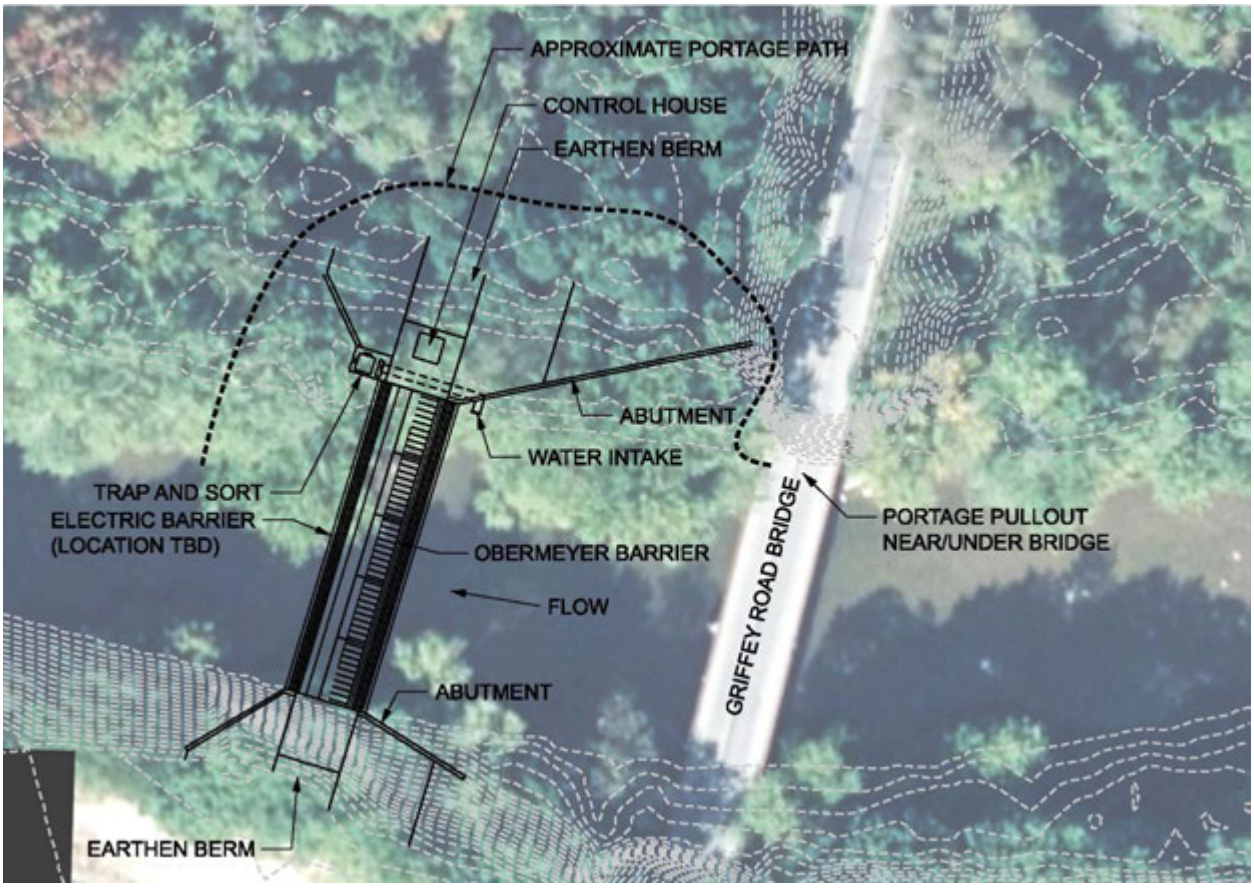


Figure 29: Plan-view of approximate location and design details of the recommended plan.

An Obermeyer or adjustable crest barrier in combination with an electric barrier is the selected alternative. Several factors were weighed in making this selection and are described in detail throughout this report. The adjustable crest barrier will be approximately five feet in height above the current creek bed. This is based on hydraulic modeling discussed in detail in Section 3.5 and associated appendix (Appendix A-2). The barrier will be roughly 110 feet wide, not including the abutments at each bank. The intent is for the barrier to match the existing bank to bank width of the creek at the selected location. During the detailed design phase, the design team will consider the best location for the electric barrier, measures to prevent fish mortality under the adjustable crest barrier, and bracing details for the adjustable crest to ensure the barrier functions as intended. It is likely that parasitic electrical arrays will be needed on each side of the new barrier to prevent stray current from causing corrosion on nearby structures and utilities. The need to use these arrays will be determined during detailed design.

Trap and sort will be used to pass fish and remove lamprey. A slotted fishway will also be considered during the detailed design phase. Currently the plan is to not include a fishway for fish passage. The barrier will be lower to approximately match the current creek bottom when lamprey are not running upstream. This will allow other fish species to pass the barrier during different times of the year. A jumping pool may also be included with the barrier. The size and effectiveness of a jumping pool will be investigated during the detailed design phase.

Conneaut Creek is used for paddle sports and portage features will be evaluated during the detailed design phase. The current plan is for users to pull out of the water on the north bridge abutment foundation before reaching the barrier, make their way over the earthen berm and then return to the creek a safe distance downstream of the barrier (Figure 29). The total footprint of the portage resides on Pennsylvania public land. Features such as ramps, stairs, etc. will be considered during the detailed design phase.

6.3 Cost Estimate

The USACE developed a detailed cost estimate for the Recommended Plan where various cost assumptions with respect to contingencies, engineering and design costs, and supervision and administration costs were reviewed and developed in more detail (Appendix A-4). The Class 3 construction cost estimate for this project was prepared using MCACES 2nd Generation MII Version 4.4. The preparation of the cost estimate is in accordance with USACE cost engineering guidelines and policies.

The project first cost was developed by estimating the construction costs for the individual measures as described in the recommended plan (Adjustable Low Crest Low Barrier (Obermeyer), Electric Barrier, Trap & Sort Facility, Jumping Pool, Portage) and adding in contingency costs (17.93 to 43.02% depending upon the work category), engineering & design costs, and, supervision & administration costs (Table 27 - Table 28). The project first cost to design and implement the recommended plan is $9,010,000. The project first cost is converted to an average annual cost using a federal discount rate 2.75 percent and a 50-year period of analysis (2027-2076). Annual maintenance was added to the average annual cost to arrive at total average annual cost for the recommended plan. Details of the anticipated annual maintenance are provided in Section 6.5.

Table 27: Recommended Plan Implementation Cost Estimate

Cost Categories	QTY	Unit	Cost
Mob/Demob	1	EA	$939,852
Cofferdams/Water Diversion	1	EA	$193,803
Concrete Barrier/ Berm/ Wingwalls	1	EA	$806,509
Electric Barrier and Control Features	1	EA	$1,689,568
Obermeyer Gate	1	EA	$1,391,268
Estimated Cost of Construction			**$5,021,000**
Contingency Costs (17.93 to 43.02% depending upon the work category)			**$1,657,000**
Total Estimated Cost of Construction (rounded to the nearest thousand)			**$6,678,000**

Table 28: Recommended Plan Design and Implementation Cost Estimate and Economic Summary

I. Project Costs	
a. Project First Cost	
1. Contractors Earnings + Contingencies	$6,678,000
2. Engineering and Design	$1,445,000
3. Supervision and Administration	$646,000
4. LERRD	$241,000
Project First Cost	**$9,010,000**
b. Average Annual Costs	
Average Annual Investment Costs	$338,328
OMRR&R	$90,100
Total Average Annual Costs	**$428,428**
Ecosystem Restoration Benefits (AAHU)	160
Average Cost per Unit of Habitat	**$2,678**

6.4 Lands, Easements, Rights-of-Way, Relocations, and Disposal

A USACE Real Estate Evaluation, including all necessary land acquisition, must be conducted for the project in accordance with ER 405-1-12. A Real Estate Plan (REP) has been prepared for the project in Appendix A-8. The REP includes estimated land values and costs associated with the acquisition of LERRDs required for construction, operation and maintenance of the recommended plan. It also identifies any facility/utility relocations necessary to implement the project. The following sections summarize key points of the REP.

6.4.1 Project Land Ownership

Four types of estates are required to complete this project: fee, road easement, temporary work area easement, and flowage easement. The fee portion of the project is contained on two properties, including one publicly owned property and one privately owned property, and contains the footprint of the barrier. The road easement is on public property. This easement will be used for access to the structure. The temporary work area easement is on public property immediately next to the barrier to help facilitate construction of the structure. The flowage easement is required to compensate private landowners for the areas of their properties that will be inundated upstream as a result of barrier construction.

6.4.2 Relocations

No utility or facility relocations are anticipated for this project.

6.4.3 Values

The non-federal sponsor will be required to provide LERRDs covering approximately 4.936 acres. The non-federal sponsor is eligible to receive credit in the estimated amount of $251,000 toward its share of the total project costs for the value of the LERRDs and associated cost. Table 29 presents the estimated values associated with real estate acquisition. See Figure 30 for the real estate plan map detailing the project area and easements required for implementation of the recommended plan. Note, the area of

flowage easement differs slightly from the calculated HEC-RAS inundation area of 3.8 acres. This difference is explained by the need to smoothen some of the inundation boundaries when determining the appropriate boundaries for the flowage easements.

The total federal administrative costs are estimated to be $50,000. This includes funds for non-federal sponsor oversight, landowner's meetings, and review of agreements. This amount is an estimate and may increase or decrease based on actual acquisition and oversight needs.

Table 29: Estimated costs associated with real estate acquisition.

Estate	Acres	Costs
Fee	0.629	$5,000
Road Easement	0.088	$1,400
Temp Work Area Easement	0.089	$3,400
Flowage Easement	4.13	$33,000
Total Lands	**4.936**	**$42,800**
Lands Incremental Costs (20%)		$8,560
Sponsor Administrative Costs		$100,000
Federal Administrative Costs		$50,000
Contingency and Escalation		$50,000
Total LERRD		**$251,360**

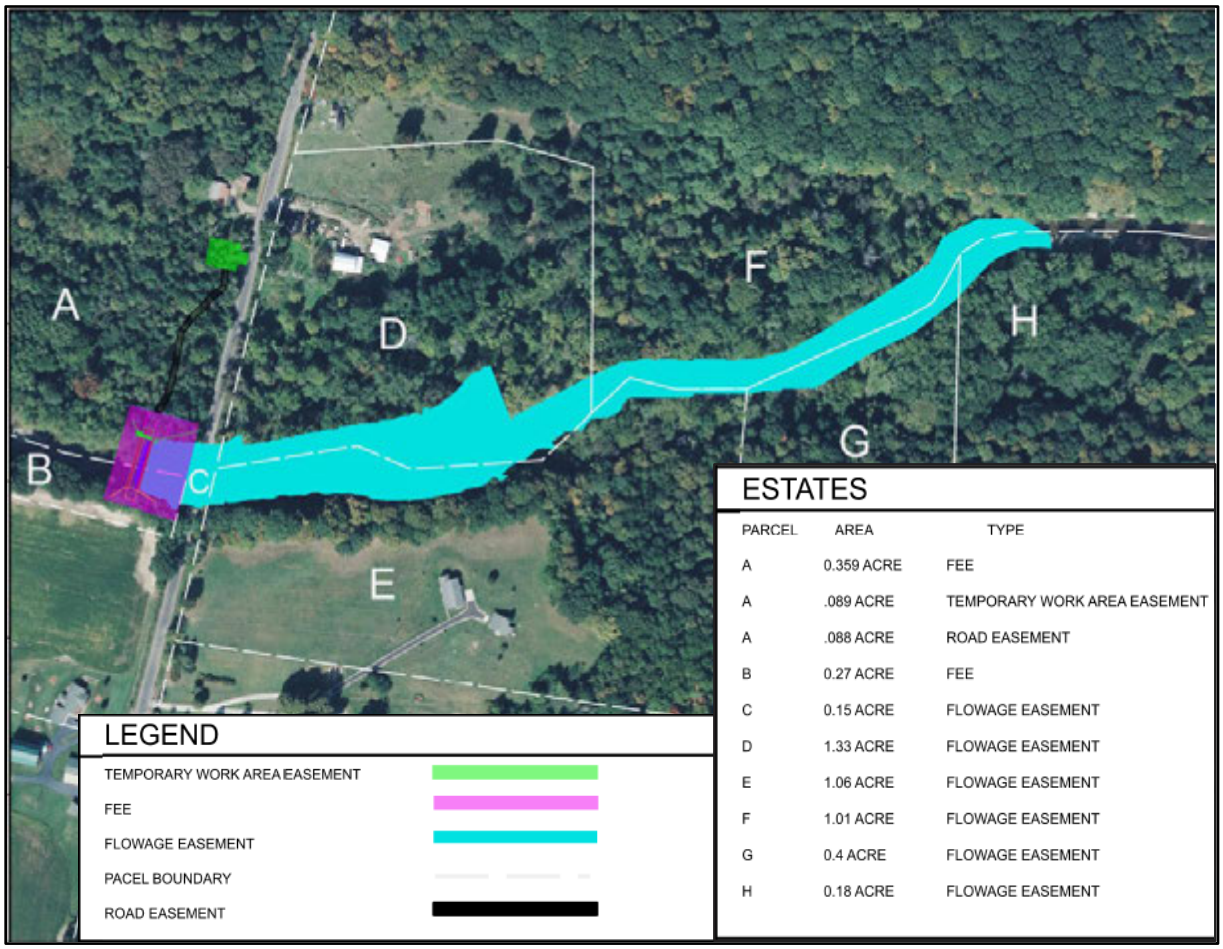


Figure 30: Real estate map including associated boundaries.

6.5 Operations, Maintenance, Repair, Replacement and Rehabilitation (OMRR&R)

After construction, the non-federal sponsor is responsible for operation and maintenance of the project. Estimated average OMRR&R costs for Alternative 4a, the Recommended Plan, are $75,550 annually. Operations and maintenance is anticipated to include seasonal operation of the adjustable crest barrier, operation of the electrical barrier, operation of the trap and sort system, and routine maintenance of the system. To alleviate concerns regarding potential failure of the air bladder, a bracing system was added to the conceptual design for Alternative 4a. The non-federal sponsor may choose to brace the barrier in the elevated position for the duration of the sea lamprey migration season, in which case operation would require manually raising the barrier at the beginning of the season and lowering it at the end of the season. Similarly, the electrical barrier may be turned on at the start of the sea lamprey migration season or only turned on during precipitation events in which flows cause the 18-inch drop to be lost. In either case, labor is associated with turning the system on and off. The trap and sort fish passage structure will require manual identification and release of fish.

It is likely that parasitic electrical arrays will be needed on each side of the new barrier to prevent stray current from causing corrosion on nearby structures and utilities. The need to use these arrays will be determined during detailed design. Based on this review, USACE will characterize the OMRR&R associated with the adjustable crest barrier. Operations and maintenance of the adjustable crest barrier may also include periodic removal of debris and maintenance or replacement of the air bladder.

Throughout the feasibility study, USACE regularly coordinated with the non-federal sponsor and project partners to optimize the conceptual design with respect to efficiency and OMRR&R requirements. The non-federal sponsor, GLFC, has indicated that it is aware of these requirements and that it is willing and capable of meeting them.

6.6 Monitoring and Adaptive Management

In accordance with Section 2039(a) of the WRDA 2007, a monitoring and adaptive management plan must be developed for ecosystem restoration projects. The monitoring and adaptive management plan is intended to detail how the success of ecosystem restoration measures will be measured and determined.

The successful blocking of upstream movement of migrating sea lamprey above Griffey Road as proposed by the Recommended Plan will be ensured by implementation of the monitoring and adaptive management plan which is included as Appendix A-5. The monitoring and adaptive management plan will evaluate the success of the restoration measures in achieving the desired objectives by collecting field measurements that represent the function of various plan components. It is anticipated that monitoring will extend over a 10-year period. For this project, monitoring will primarily focus on blocking the movement of sea lamprey above Griffey Road, successful passage of native fish species during the sea lamprey run, diversity of the fish community in Conneaut Creek within the project area, wetland size and quality upstream of barrier between Griffey Road and SR-6N, and stream quality within the same area as the wetlands. Data related to sea lamprey and fish species successful passage and diversity will be collected yearly. The wetland size and quality coupled with stream quality within the project area will be monitored every two years. It is anticipated that the monitoring of lamprey and operation of the trap and sort will be conducted by USFWS and PAFBC. The annual fish community and lamprey surveys conducted by USFWS, PAFBC, and PADEP will also be used to collect all information except the wetland and stream quality information. The cost of monitoring over this period is estimated at $300,000, or approximately $25,000 per year on the odd years and $35,0000 on the even years for ten years (Appendix A-5), and has been included with the Preconstruction, Engineering, and Design (PED) costs. This includes the cost of travel, data collection, and preparation of yearly reports.

An adaptive management plan has also been prepared and is included with the monitoring plan in Appendix A-5.

6.7 Project Risks

The primary areas of risk and uncertainty associated with this project relate to real estate acquisition, public safety, and environmental permitting. Risk and uncertainty will be reduced, or eliminated, through additional coordination and analysis conducted during the design phase prior to construction.

Implementation of the recommended plan requires acquisition of real estate to support project operation and maintenance. Such real estate includes acquisition of flowage easements on streamside properties that will experience inundation upon construction. The parcels subject to inundation are currently privately owned. The non-federal sponsor will need to work with these landowners to secure real estate necessary for project construction. The non-federal sponsor has indicated that it does not wish to utilize eminent domain for this project and also does not want other agencies or groups to utilize eminent domain on their behalf for this project. Because of this, there will be no path forward to acquire the land necessary to complete the project if any landowner within the project footprint does not willingly agree to sell the land necessary to construct and maintain the project. This risk has been lowered by selecting a barrier type that minimizes the extent and duration of upstream inundation while still effectively blocking

sea lamprey. Additionally, significant coordination with private landowners was conducted during this feasibility study to reduce this risk to the extent practicable.

Additionally, the electrical component of the recommended plan has the potential to impact public safety. Risk associated with public safety will be minimized through development of a detailed safety plan for the recommended plan during the design phase. Safety measures for operation of the electrical barrier will likely include signage a certain distance upstream and downstream warning the public of the electrical barrier. Other possible safety measures may include flashing lights while the barrier is operating and a floating buoy line directing paddlers and hikers to the takeout location of the portage upstream of the barrier.

Additional risks associated with this project relate to Sections 401 and 404 of the CWA and completion of on-going ESA coordination. During construction there will be a permanent loss of 0.03 acre of wetlands and 25 LF of Conneaut Creek for site access and construction of the support facilities for the electric barrier and earthen berms on both sides of the creek. However, the 3.8-acre seasonal inundation area upstream of the low adjustable crest barrier is likely to permanently convert some of the existing 0.98 acre of forested scrub-shrub wetlands and forested riparian corridor within this area to open water or from forested/scrub shrub areas to emergent vegetated areas, as well as temporarily impound approximately 1,489 LF of Conneaut Creek and 324 LF of intermittent stream resulting in a minor detrimental impact. The increase in hydrology in the inundation area will also convert adjacent areas that are currently upland to wetlands, which is anticipated to compensate for the conversion of some of the existing wetlands to open water thereby creating or restoring wetlands and mitigating the impacts to existing wetlands.

This periodic disturbance will likely cause a change in the vegetation from its current composition, but less of a change than those anticipated with the fixed crest barrier alternatives. This conversion of adjacent upland areas to wetlands, and only seasonal impoundment of stream upstream of the barrier coupled with the benefits of the overall project, offset the minor detrimental impacts to the functions and values of the impacted wetlands and streams. Coordination with PADEP regarding these impacts and requirements under Sections 401/404 is on-going. Current USACE policy does not authorize compensatory mitigation for ecosystem restoration projects. The USACE will continue to coordinate with PADEP on these impacts and benefits to ensure the conceptual design is the least environmentally damaging practicable alternative and that the benefits of project offset any impacts to the functions and value of the existing wetlands and streams.

The proposed project is also within the range of three federally protected species: the Indiana bat, northern long-eared bat, and red knot, as well as two proposed endangered species: the tricolored bat and salamander mussel. Coordination with USFWS regarding potential impacts to these species is on-going. It is anticipated that the proposed project will not result in adverse impacts to federally protected species and at least one of the *proposed* endangered species, but additional surveys and analysis may be required during design and implementation to confirm this. These risks associated with environmental permitting may cause schedule delays and cost increases, but USACE continues to mitigate these risks through early and consistent coordination with appropriate resource agencies.

The proposed adjustable low crest barrier may also create a submerged hydraulic jump effect when it is raised during the sea lamprey run (March 1 – June 30). While the severity of the submerged hydraulic jump is uncertain, there is potential for fish mortality if fish are caught by the jump when the electrical barrier turns on. Project partners have proposed measures to block fish from aggregating underneath the barrier, such as a bar or mesh screen. Current conceptual designs do not include this feature, but detailed H&H analysis will be conducted during Design and Implementation to ascertain the severity of the

submerged hydraulic jump and the need for such measures. If this analysis indicates that a measure to prevent fish from moving underneath the barrier is required, slight cost increases may occur. However, it is likely that the cost of such a structure is within the contingency estimates currently incorporated into the cost estimate.

6.8 Cost Sharing

The total project cost to design and implement the recommended plan, escalated out to the mid-point of construction, is $9,714,000. The total project cost plus the cost of the feasibility study is $10,615,000. In accordance with the cost share provisions of Section 506 of the Water Resources Development Act of 2000, as amended, the federal share to design and implement the recommended plan is 65 percent and the non-federal share is 35 percent (Table 30). Additionally, EP 1165-2-502 provides guidance stating that recreational features are cost shared 50 percent federal and 50 percent non-federal. The federal cost share is estimated to be approximately $6,931,000 and the non-federal share is approximately $3,684,000.

Table 30: Federal and Non-Federal Cost Apportionment.

Item	FY21- FY24	FY25	FY26	FY27	Total
Feasibility Study	$900,000				$900,000
Plans and Specifications		$1,582,000			$1,582,000
Implementation Ecosystem			$6,745,000	$1,115,000	$7,860,000
Implementation Recreation			$11,000	$11,000	$22,000
LERRDs		$251,000			$251,000
Total with feasibility	**$900,000**	**$1,833,000**	**$6,756,000**	**$1,126,000**	**$10,615,000**
Total without feasibility		**$1,833,000**	**$6,756,000**	**$1,126,000**	**$9,714,000**
Cost Sharing (Ecosystem)					
65% Federal	$620,000	$1,191,450	$4,384,250	$724,750	$6,920,000
35% non-Federal	$280,000	$ 641,550	$2,360,750	$390,250	$3,673,000
Cost Sharing (Recreation)					
50% Federal			$5,500	$5,500	$11,000
50% non-Federal			$5,500	$5,500	$11,000
Cost Sharing (with feasibility)					
Federal					**$6,931,000**
non-Federal					**$3,684,000**
Cost Sharing (without feasibility)					
Federal					**$6,311,000**
non-Federal					**$3,403,000**

6.9 Design and Construction

The schedule for project implementation assumes construction funding in the FY 2025 Appropriations Act under Section 506 of WRDA of 2000. Funding availability will be based on national priorities, magnitude of the federal commitment, economic and environmental feasibility, level of local support, willingness of the non-federal sponsor to fund its share of the project cost, and budget constraints that may exist at the time of funding. Once Congress appropriates federal funds under the Section 506 program, the USACE and non-federal sponsor would enter into a project partnership agreement (PPA). This PPA would define federal and non-federal responsibilities for implementing, operating, and maintaining the project.

After the PPA is signed, the USACE Buffalo District will produce the final plans and specifications for the project, followed by advertisement of the construction contract, and contract award. After construction is complete, final acceptance and transfer of the project to the non-federal sponsor would follow delivery of an operations and maintenance manual and as-built drawings. Monitoring and adaptive management obligations are described in Appendix A-5. The estimated schedule for project implementation is shown in Table 31.

Table 31: Design and Implementation Schedule.

Item	Date
Feasibility Study	
Complete Feasibility Study (Signed FONSI)	SEP 2024
Implementation	
PPA Execution	DEC 2024
Plans and Specifications	JUL 2025
Construction Contract Award	OCT 2025
Initiate Construction	JUN 2026
Complete Construction	OCT 2026
Operations and Maintenance	OCT 2026 – OCT 2029
Monitoring and Adaptive Management	2026 - 2036

6.10 Environmental Commitments

There is a potential for accidental spills of fuel, oil, and/or grease into the water during construction activities. The eventual contractor would be required to prepare a spill control plan and to implement appropriate measures in the event of a release. Such discharges, should they occur, are expected to be short-term and of relatively low magnitude. To further minimize this effect, the eventual contractor would be required to implement best management practices and control measures to reduce any construction related impacts. These control measures may include the implementation of silt curtains, biodegradable netting, soil binders, conservation seedings, and coir or jute mats during construction to prevent erosion and sedimentation in applicable areas.

There will be a permanent loss of 0.03 acre of wetlands and 25 LF of Conneaut Creek for site access and construction of the support facilities for the electric barrier and earthen berms on both sides of the creek. However, the 3.8-acre seasonal inundation area upstream of the low adjustable crest barrier is likely to permanently convert some of the existing 0.98 acre of forested scrub-shrub wetlands and forested riparian corridor within this area to open water or from forested/scrub shrub areas to emergent vegetated areas as well as temporarily impound approximately 1,489.4 LF of Conneaut Creek and 324.5 LF intermittent stream for a total of 2.66 acres of intermittent/perennial stream resulting in a minor detrimental impact. The increase in hydrology in the inundation area will also convert adjacent areas that are currently upland to wetlands compensating for the conversion of some of the existing wetlands to open water thereby creating or restoring wetlands and mitigating the impacts to existing wetlands. This periodic disturbance will likely cause a change in the vegetation from its current composition, but less of a change than those anticipated with the fixed crest barrier alternatives. This conversion of adjacent upland areas to wetlands, and only seasonal impoundment of stream upstream of the barrier coupled with the benefits of the overall project offset the minor detrimental impacts to the functions and values of the wetlands and streams impacted.

6.11 Environmental Operating Principles (EOP)

The EOPs were developed to ensure that USACE missions include integrated sustainable environmental practices to recognize USACE's role in, and responsibility for, sustainable use, stewardship, and restoration of natural resources across the nation. The Recommended Plan supports each of the EOPs in the following ways:

- *Foster sustainability as a way of life throughout the organization.* The Recommended Plan includes measures that limit invasive sea lamprey migration into spawning grounds in Conneaut

Creek while minimizing inundation and environmental impacts to the extent practicable. Reductions in invasive species populations contribute to the resiliency of the Lake Erie fishery.

- *Proactively consider environmental consequences of all USACE activities and act accordingly.* Throughout plan formulation, the crest height and operation of alternatives were optimized to reduce inundation and impacts to native species to the extent practicable. The Recommended Plan efficiently limits sea lamprey migration while minimizing inundation through seasonal operation and low crest height and minimizing impacts to native species through seasonal operation and fish passage measures.
- *Create mutually supporting economic and environmentally sustainable solutions.* The Recommended Plan is the NER Plan, reasonably maximizing ecosystem and economic benefits while meeting study objectives and avoiding constraints. The Recommended Plan supports the ecological sustainability of Lake Erie and positively contributes to the regional and national value of the Lake Erie Fishery.
- *Continue to meet our corporate responsibility and accountability under the law for activities undertaken by USACE, which may impact human and natural environments.* The Recommended Plan is environmentally acceptable and compliant with all applicable laws, regulations, and policies.
- *Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs.* Throughout the project lifecycle, risks have been managed using a risk register. The risk register assisted with decision making to reduce uncertainty and risk throughout the feasibility study, and the risk register will continue to be used during subsequent phases of this project.
- *Leverage scientific, economic, and social knowledge to understand the environmental context and effects of USACE actions in a collaborative manner.* Plan formulation relied upon known and accepted techniques to calculate ecological and economic benefits and to compare plans (i.e., habitat unit calculations, CE/ICA, etc.). Alternatives were formulated and optimized in collaboration with project partners, including subject matter experts from USACE, USFWS, PFBC, and other agencies and organizations.
- *Employ an open, transparent process that respects views of individuals and groups interested in USACE activities.* Public, stakeholder, and agency outreach was conducted throughout this project, including scoping meetings, charettes, landowner outreach, and regular and reoccurring partnership meetings. Additional outreach will be conducted during the public review period for the draft feasibility report.

6.12 Views of the Non-Federal Sponsor

The non-federal sponsor, the GLFC, is supportive of the Recommended Plan. Conceptual design of the Recommended Plan was refined in collaboration with the GLFC and partner agencies to optimize the design by reducing the depth of water requiring electrification, reduce O&M requirements, and minimize chance of failure of the adjustable crest barrier. The GLFC is aware of the OMRR&R, real estate acquisition, cost share, and other requirements necessary for project implementation.

Section 7 Environmental Compliance Summary

7.1 Environmental Compliance Statutes & Executive Orders

The following is a list of the applicable, relevant, and appropriate federal statutes and executive orders that were considered for the proposed project and a description of the project's compliance with each.

7.1.1 Archaeological and Historical Preservation Act of 1979 (16 USC 470 et seq.); National Historic Preservation Act of 1966 (16 USC 470 et seq.); Executive Order 11593 (Protection and Enhancement of the Cultural Environment), May 13, 1979

The proposed project's potential for impacting cultural resources has been evaluated in accordance with Engineer Regulation (ER) 1105-2-50 and 36 CFR 800. Due to the project location and type, it is USACE's determination that no historic properties or cultural resources in or adjacent to the APE would be affected by project construction. PA SHPO concurred with this finding on March 29, 2024 (Appendix A-6). An effects determination is being submitted to THPOs for each of the federally recognized tribes for confirmation of this determination. Additional information can be found in Section 4.2.10.

7.1.2 American Indian Religious Freedom Act (42 USC 1996); Native American Graves Protection and Repatriation Act (25 USC 3001 et seq.)

Scoping information was provided to all the tribes listed in Section 7.2.2. No sacred sites or objects have yet been identified through tribal consultation. Therefore, it is not expected that any adverse effect would be incurred to any religious rights because of the proposed project. No Native American grave sites or other sensitive sites are expected to be affected by the project due to its location in Conneaut Creek. Therefore, the proposed project is in compliance with these Acts. A draft of this DPR/EA is being submitted to the above-mentioned parties for final review and comment on this determination. Additional information can be found in Section 4.2.10.

7.1.3 Clean Air Act, as Amended (42 USC 7401 – 7671g)

Project coordination was initiated with the USEPA through the public scoping process (Appendix A-6). Comments were received on August 22, 2022 and have been addressed in this EA. Erie County, PA is in attainment of the National Ambient Air Quality Standards for six principal pollutants (carbon monoxide, lead, nitrogen dioxide, ozone, particle pollution, and sulfur dioxide). Thus, there is no need for conformity analysis or a Record of Non-Applicability (RONA). Refer to Section 4.3.1 for additional information.

7.1.4 Clean Water Act, as Amended (33 USC 1251 et seq.)

A draft Section 404(b)(1) Evaluation has been prepared for the project pursuant to Section 404 of the Clean Water Act (Appendix A-6). This evaluation will be finalized prior to the PED Phase of the project following release of a Section 404(a) public notice regarding the proposed discharge of fill into Conneaut Creek and wetlands. The project will not require compensatory mitigation due to the fact the project will create/restore wetlands adjacent to existing wetlands and this coupled with the benefits of the overall project offset the minor detrimental impacts to the functions and values of the wetlands and streams. In accordance with Section 401 of the Act, the USACE will also apply for a water quality certification from the state prior to the PED Phase.

7.1.5 Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA), as Amended (42 USC 9601-9675), and Resource Conservation and Recovery Act of 1976 (42 USC 6901 et seq).

Project coordination was initiated with agencies and interests, including the USEPA, via the scoping process. No comments related to CERCLA or RCRA were received. No CERCLA designated sites or sites that are part of the National Priorities List (NPL) are located in the vicinity of the project area. A Phase I Environmental Site Assessment of the project site did not identify any areas of concern or with potential to contain hazardous, toxic, or radiological waste (Appendix A-7). Therefore, the proposed project is in compliance with these Acts.

7.1.6 Endangered Species Act of 1973, as Amended (16 USC 1531 et seq.)

Consultation with the USFWS relative to the possible presence of T&E species or their critical habitats within the affected area was initiated on July 22, 2022. The USFWS Information for Planning and Consultation (IpaC) system was reviewed, which indicated that there are three federally listed T&E species and two proposed species whose range includes the project area. Concurrence is still pending from the USFWS with the USACE "no effect" determination for the red knot and determination of "may affect but is not likely to adversely affect" for the northern long-eared bat and Indiana bat. The tricolored bat is not currently listed but likely will be listed before the project goes to construction. Based on the information provided on the USFWS website, this species may use a wide range of habitat. It is currently anticipated that similar tree cutting dates as required for Indiana bat and northern long eared bat will apply to this species. The salamander mussel is also not currently listed but likely will be listed before the project goes to construction. The USFWS is also proposing critical habitat for this species and the proposed project location at Griffey Road is within the 62 river miles of Conneaut Creek currently proposed as critical habitat. Detailed surveys conducted by PADEP and PADCNR have not identified salamander mussels within the reach of stream near Griffey Road. This proposed project would reduce or eliminate the application of lampricide over approximately 50 miles of stream upstream of Griffey Road with much of that being within this proposed critical habitat for salamander mussels. Thus, despite this project potentially impacting some of the proposed critical habitat during construction and seasonal inundation, the project would protect a much larger portion of this critical habitat from lampricide application. Coordination with USFWS and state and local agencies with regard to this issue is on-going (Appendix A-6).

7.1.7 Farmland Protection Policy Act (Subtitle I of Title XV of the Agriculture and Food Act of 1981), 7 USC 4201 et seq.; Executive Memorandum – Analysis of Prime and Unique Farmlands, CEQ Memorandum, August 30, 1976, January 4, 1979

Coordination was initiated with the U.S. Department of Agriculture – Farm Service Agency and National Resources Conservation Service via project scoping. No comments were received in this regard. Since the proposed work would not affect prime and unique farmlands in any manner, the recommended action is in compliance with this act.

7.1.8 Federal Water Project Recreation Act, as Amended; 16 USC 460l-12 – 4601-22, 662

Full consideration has been given to opportunities afforded by the project for outdoor recreation and fish and wildlife enhancement. Review copies of this DPR/EA are being provided to the U.S. Department of the Interior regarding recreation and fish and wildlife activities for conformance with the comprehensive nationwide outdoor recreation plan formulated by the Secretary of the Interior.

7.1.9 Fish and Wildlife Coordination Act (16 USC 661 et seq.)

Coordination with the USFWS, PAFBC, PADCNR, and PADEP was initiated through the scoping process. The USFWS did not request funding to complete a Coordination Act Report. No correspondence was received by email, but monthly meetings throughout the feasibility study have been held with members of each of these organizations, who have reviewed and provided comments on all planning steps. The USACE will continue to collaborate with these agencies to ensure that relevant information on the study area is available and obtain the respective agency views concerning the significance of fish and wildlife resources and anticipated project impacts.

7.1.10 Land and Water Conservation Act (16 USC 460l-12 – 4601-22, 662)

In planning the proposed project, full consideration has been given to opportunities afforded by the project for outdoor recreation and fish and wildlife enhancement. Draft copies of this EA are being provided to the U.S. Department of the Interior regarding recreation and fish and wildlife activities for conformance with the comprehensive nationwide outdoor recreation plan formulated by the Secretary of the Interior.

7.1.11 Land and Water Conservation Fund Act of 1965; 16 USC 460l-4 et seq.

Project coordination was initiated with agencies and interests, including the U.S. Department of the Interior, via the scoping process. No comments were received regarding this Act. No property that was acquired or developed with assistance from this fund is present in the project area or would be affected by the project.

7.1.12 National Environmental Policy Act (42 USC 4321 – 4347)

Project coordination was initiated with agencies and interested parties via the scoping process on July 22, 2022. This EA and FONSI have been prepared in accordance with the Council on Environmental Quality's "Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act," 40 CFR 1500-1506; and USACE Regulation ER 200-2-2, "Environmental Quality: Policy and Procedures for Implementing NEPA." Additionally, and in accordance with CEQ's revised NEPA implementing regulations effective July 2023, this report has been prepared to ensure that a reasonable range of alternatives are included, which are technically and economically feasible and that meet the project's purpose and need. This EA also incorporates all reasonably foreseeable effects to applicable public interest factors, including but not limited to climate change, greenhouse gases, and cumulative effects, as appropriate. Time limits and page limitations follow Section 1001 of WRDA 2014. Full compliance will be attained once the public review period is concluded, and it is confirmed that no significant adverse impacts were identified and the FONSI is signed.

7.1.13 River and Harbor and Flood Control Act of 1970 (P.L. 91-611)

The USACE planning actions have fulfilled the requirements of the Act. All 17 points identified in Section 122 of the Act (P.L. 91-611) have been evaluated in this EA.

7.1.14 Toxic Substances Control Act, 15 USC 2601-2671 et seq

Project coordination was initiated with agencies and interests, including the USEPA, via the scoping process. No comments were received regarding this Act. The proposed project would not involve any PCB, asbestos, radon, or lead-based paint activities. Therefore, the project is in compliance with this act.

7.1.15 Water Resources Planning Act, 42 USC 1962 et seq.

This project has been formulated and evaluated following the guidelines outlined in "Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies" (2013), as is required by the Act.

7.1.16 Watershed Protection and Flood Prevention Act

Based on evaluation of the project, no significant adverse impacts to watershed protection or flood prevention are expected. The project will be located in Conneaut Creek and will not contribute to the degradation of any watershed or exacerbate any flooding potential.

7.1.17 Wild and Scenic Rivers Act (16 USC 1271, et seq.)

Not applicable to the proposed project due to this portion of Conneaut Creek not being designated as a Wild or Scenic River.

7.1.18 Executive Order 11988, Flood Plain Management, May 24, 1977

This proposed plan does involve development, occupancy, or modification of floodplains. However, H&H modeling shows that the proposed plan will not result in any flooding of any structures. The scoping has been coordinated with FEMA and the draft DPR/EA will be prior to finalization. Therefore, USACE has concluded that the recommended action is in compliance with this Executive Order.

7.1.19 Executive Order 11990, Protection of Wetlands, May 24, 1977

The proposed plan will permanently impact 0.03 acres of wetlands and increase inundation and duration of water seasonally in 0.98 acres of wetlands. However, the overall benefits of the project to the watershed and aquatic community more than offset these temporary and permanent impacts. Therefore, the proposed project is in compliance with this Executive Order.

7.1.20 Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, February 11, 1994; Executive Order 12948, Amendment to Executive Order 12898, January 30, 1995

The proposed project would not result in disproportionately high or adverse human health or environmental effects on minority or low-income populations. See Sections 4.2.11 for additional details.

7.1.21 Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, January 11, 2001

The project lies within the range of the bald eagle, a species protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Other Migratory Birds of Concern whose range includes the project area include the belted Kingfisher, blue-winged warbler, Canada warbler, cerulean warbler, chimney swift, eastern meadowlark, evening grosbeak, red-headed woodpecker, and wood thrush. Many of these species including the belted Kingfisher, warblers, evening grosbeak, red-headed woodpecker, and wood thrush would likely be present with in the project area. They will likely avoid the project area during construction, but there are no anticipated long-term impacts to these species or their use of the habitat after construction. See Sections 4.3.6 through 4.3.10 for additional information.

7.1.22 Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks, April 21, 1997

The executive order requires that all federal agencies must identify and address each environmental health risk and safety risk that may disproportionately affect children and address such risks in their policies, programs, activities, and standards. The vicinity of the proposed project is the City of Lorain. Limited potential exists for increased residential growth in the vicinity. There are no schools, hospitals, or wildlife refuges within the affected site, although there are residences located near the project location and the area is used occasionally for water sports. The proposed project, however, is not anticipated to disproportionately affect children, or pose any such risks. Therefore, consideration (in regard to this executive order) for other effective and feasible alternatives to the planned action is not necessary.

7.1.23 Executive Order 14008, Tackling the Climate Crisis at Home and Abroad, January 27, 2021

The USACE Climate Action Plan was developed in order to comply with this executive order, and it commits USACE to integrate the best available observed and forward-looking climate information into its missions, programs, and management functions. Consideration of climate change adaptation and resiliency, as discussed in Section 3.7.8 and Section 4.3.4, have been completed to comply with this executive order and the USACE Climate Action Plan.

7.2 Public Involvement

This section provides an overview of efforts to engage the public and other agencies throughout the course of this study.

7.2.1 Public Views and Comments

Input on public views was received through coordination with the sponsor, coordination with other agencies, public review of draft and interim products, and through public meetings. The following briefly summarizes some of the significant events that were used to incorporate public and stakeholder input in the planning process.

Public Meeting on May 24, 2022
A public meeting was held at the Northwestern High School cafeteria, 200 Harthan Way, Albion, PA 16401 from 6:00 – 8:00 PM. Representatives from USACE, USFWS, PAFBC, PADEP GLFC, Pennsylvania Sea Grant, and ODNR were there to present aspects of the project and answer any questions from the attendees in a poster session. More details are provided in Appendix A-6.

Public Scoping on July 22, 2022
A scoping document was released for public comment on July 22, 2022. Announcements soliciting comments on the scoping document were made through the mailing of postcards and on social media. Comments received in response to this scoping document are included in Appendix A-6. All comments received have been addressed in this document.

Landowners Meeting on November 9, 2022
A landowners meeting was held at the Northwestern High School cafeteria, 200 Harthan Way, Albion, PA 16401 from 6:00 – 8:00 PM. Representatives from USACE-LRB, USFWS, PAFBC, were there to present aspects of the project and answer any questions from the landowners near Griffey Road. A

questionnaire was handed out to assess the landowners support of the project. Details are available in Appendix A-6.

Landowners Meeting on September 13th, 2023

A landowners meeting was held at the proposed project location at 8180 Griffey Road from 10:00 – 1200 PM. Representatives from USACE-LRB, USFWS, PAFBC, were there to present aspects of the project and answer any questions from the landowners near Griffey Road. Materials on the tentatively selected plan were provided by mail before the meeting and were available in-person during the meeting.

Albion Fair on September 13th, 2023

Representatives from USACE-LRB, USFWS, PAFBC, were there to talk to the public about efforts to control sea lamprey and reduce the need for lampricide treatments that can impact native fish and wildlife of Conneaut Creek. Materials on the tentatively selected plan were provided by mail before the meeting and were available in-person during the meeting.

The comments received at the two public meetings and from the scoping have centered on four main issues:

1. Concerns about continued lampricide application in the stream after the large fish die off that occurred following the 2018 lampricide application.

   Response: The current study and proposed recommended plan is designed to physically block sea lamprey as far downstream in the Commonwealth of Pennsylvania and reduce or eliminate the need for future applications of lampricide within the stream.

2. Concerns about impacts to the fish community with the installation of a barrier to block sea lamprey.

   Response: The recommended plan has been designed to block lamprey while having the least impact to the fish community. A trap and sort operation will be operated by USFWS and PAFBC during the barrier's operation period (March – July) and then, during the rest of the year, the barrier will be lowered to allow free movement of fish upstream and downstream similar to preconstruction conditions.

3. Concerns about potential flooding as a result of any structure placed in the stream to block lamprey migration.

   Response: The preferred plan has been designed to minimize inundation and result in no impacts to any structures within the 100 year floodplain. The O&M plan will take into account debris removal at the structure to avoid any potential flooding issues from increased debris at the structure.

4. Concerns regarding impacts to existing natural condition of the stream.

   Response: The preferred plan is proposed to be installed immediately downstream of Griffey Road bridge to avoid impacts to other higher quality areas and take advantage of the already impacted area near the bridge. In addition, the barrier is proposed to be seasonally operated at a low elevation with electricity being employed to increase effectiveness during periods of high flow. This will reduce the amount of inundation during the lamprey migration period and reduce permanent impacts to high quality areas and lands upstream of the bridge.

7.2.2 Agencies/Public Contacted

Federal

Federal Emergency Management Administration
U.S. Department of Agriculture:
- Farm Service Agency
- Forest Service
- Natural Resource Conservation Service

U.S. Department of Commerce:
- National Oceanic and Atmospheric Administration
- Ecology and Conservation Office

U.S. Department of Energy
U.S. Department of Health and Human Services
U.S. Department of Housing and Urban Development
U.S. Department of the Interior:
- Fish and Wildlife Service
- Geological Survey

National Park Service
- Office of Environmental Project Review

U.S. Department of Transportation:
- Federal Highway Administration

U.S. Environmental Protection Agency
Senator Robert Casey Jr. (PA), current
Senator John Fetterman (PA), current
Senator Patrick Toomey (PA), 2011-2023
Rep. Mike Kelly, District 16 (PA), current

Tribal

Delaware Nation
Delaware Tribe of Indians
Seneca Nation of Indians
Seneca-Cayuga Nation
Tonawanda Seneca Nation
Miami Tribe of Oklahoma

State

Ohio Environmental Protection Agency
Ohio Department of Natural Resources:
- Division of Fisheries

Pennsylvania Department of Agriculture
- Noxious Invasive, Poisonous Plant Program

Pennsylvania Department of Environmental Protection
- Bureau of Waterways Engineering and Wetlands
- Bureau of Water Resource Management

Pennsylvania Department of Conservation and Natural Resources
- Pymatuning State Park

Pennsylvania Department of Transportation
Pennsylvania Fish and Boat Commission:

Bureau of Fisheries
Pennsylvania Game Commission
Pennsylvania State Farm Service Agency
Pennsylvania State Historic Preservation Office
Senator Dan Laughling, PA District 49
Rep. Parke Wentling, PA District 7

Regional/Local

Erie County, PA
Clerk
County Executive
Commissioners
Soil and Water Conservation District
Health Department
Crawford County, PA
Soil and Water Conservation District
Great Lakes Commission
Great Lakes Fishery Commission
Ohio Lake Erie Commission
Town of Conneaut
Town Supervisors

Individuals/Organizations

Audubon Society of Western Pennsylvania
Presque Isle Audubon Society
Lake Erie Charter Boat Association
League of Ohio Sportsman
PA Bass Chapter Federation, Inc.
Pennsylvania Bass Chapter Federation, Inc.
Pennsylvania Council of Trout Unlimited
Sierra Club
S.O.N.S. of Lake Erie Fishing Club
The Nature Conservancy
Trout Unlimited
Adjacent Property Owners (70)

Section 8 District Engineer Recommendation

This report documents the procedures and findings of the Section 506 GLFER feasibility study for Conneaut Creek, Pennsylvania. Based on the analysis contained herein, Alternative 4a, consisting of an adjustable low crest and electric barrier with a trap and sort system and jumping pool, provides the greatest ecological benefits while being cost effective and avoiding any significant environmental impacts. This alternative will provide 160 AAHU through protection of approximately 50 river miles of Conneaut Creek from sea lamprey invasion and reducing the need for lampricide applications in the creek. This alternative is expected to be acceptable to the public, stakeholders, the Commonwealth of Pennsylvania, and applicable federal agencies. The non-federal sponsor is the Great Lakes Fishery Commission.

I recommend that Alternative 4a be constructed generally in accordance with the plan herein, and with such modifications thereof at the discretion of the Chief of Engineers may determine to be advisable, at an estimated total cost of $9,714,000 including $6,311,000 in federal funds.

The recommendations contained herein reflect the information available at this time and current departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national Civil Works construction program nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are transmitted to a higher authority as proposals for authorization and implementation funding. However, prior to transmittal to a higher authority, the sponsor, states, interested federal agencies, and other parties will be advised of any significant modifications to the plan and will be afforded an opportunity to comment further.

Date:_____

_____
Lyle R. Milliman
Lieutenant Colonel, U.S. Army
District Commander

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CONNEAUT CREEK SEA LAMPREY BARRIER PROJECT
P2# 495058

Section 506 – Water Resources Development Act of 1992, as amended Great Lakes Fishery and Ecosystem Restoration

Erie County, Pennsylvania

Appendix A-1:
Civil Engineering

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Introduction

Conneaut Creek, located in Northeast Ohio and Northwest Pennsylvania, is a known sea lamprey spawning stream. Currently lampricide is deployed to help control and reduce sea lamprey populations in Conneaut Creek, Lake Erie, and the rest of the Great Lakes. This feasibility report by the United States Army Corps of Engineers (USACE), in coordination with the United States Fish and Wildlife Service (USFWS) and Pennsylvania Fish and Boat Commission (PFBC), developed barrier alternatives intended to reduce the use of lampricide and increase the efficiency of sea lamprey control within Conneaut Creek. The objective of this appendix is to summarize the limited amount of Civil Engineering analyses performed, document assumptions, and describe sea lamprey barrier alternatives considered.

Soils and Geology

The Conneaut Creek watershed extends from the lake plain of Lake Erie into sloping upland south of the lake. The bedrock of the watershed is classified as Devonian age shale, underlaying layers of clay and silt soils (Taylor, 1960). A profile of the geologic formations beneath the Conneaut basin is shown in Figure 1 (Pree, 1960). The upland portion of Conneaut creek in part of Ohio and all of Pennsylvania is formed from an end moraine, where soils are classified as Ashtabula till: a silty clayey till from the lake region (Roloson, 2005).

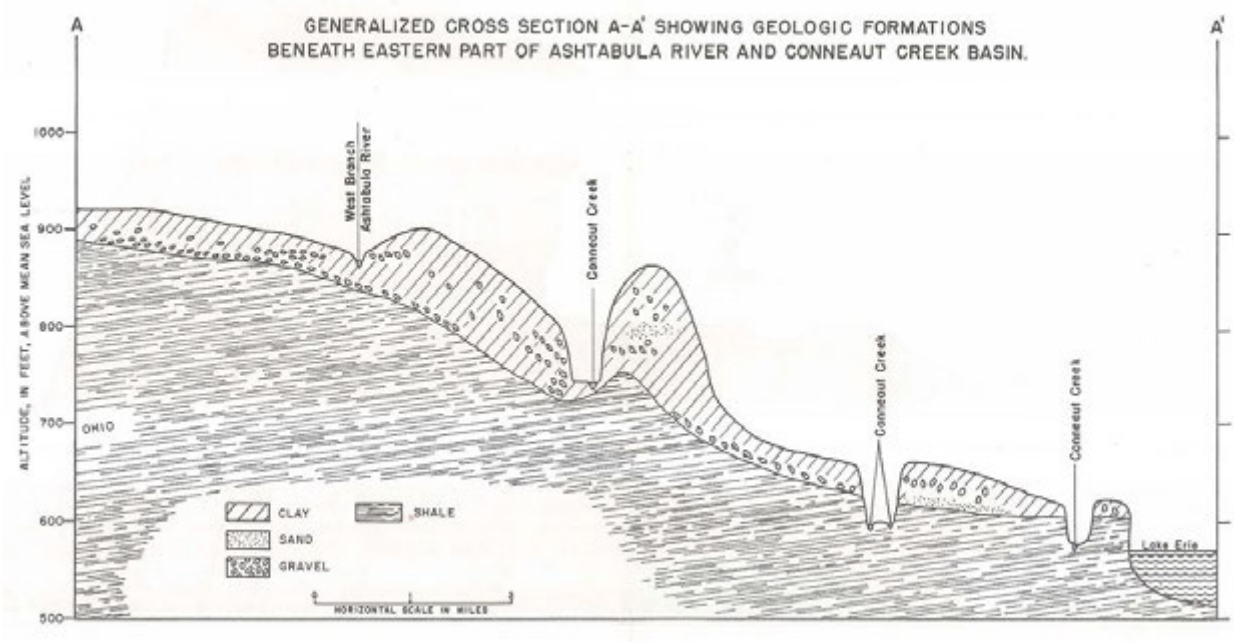

Figure 1. Conneaut Creek Basin Cross Section Showing Geologic Formations (Pree, 1960)

Conneaut Creek lies within a relatively narrow and steep valley cutting through layers of shale that define the valley walls (Figure 2). The upper reaches of the river exhibit a shallower gradient and wider floodplain than lower reaches, where at about river mile 28 the gradient of the creek becomes steeper and the valley well defined. Exposed shale bedrock can be observed in many areas of the creek, particularly downstream of river mile 28, with well-defined pool-riffle structure and excellent floodplain access. This shale is visibly weathered and would be excavatable with typical construction equipment.

Saw cuts and/or drilled holes would be used to create removal limits of the shale to be replaced by the new barrier foundation.

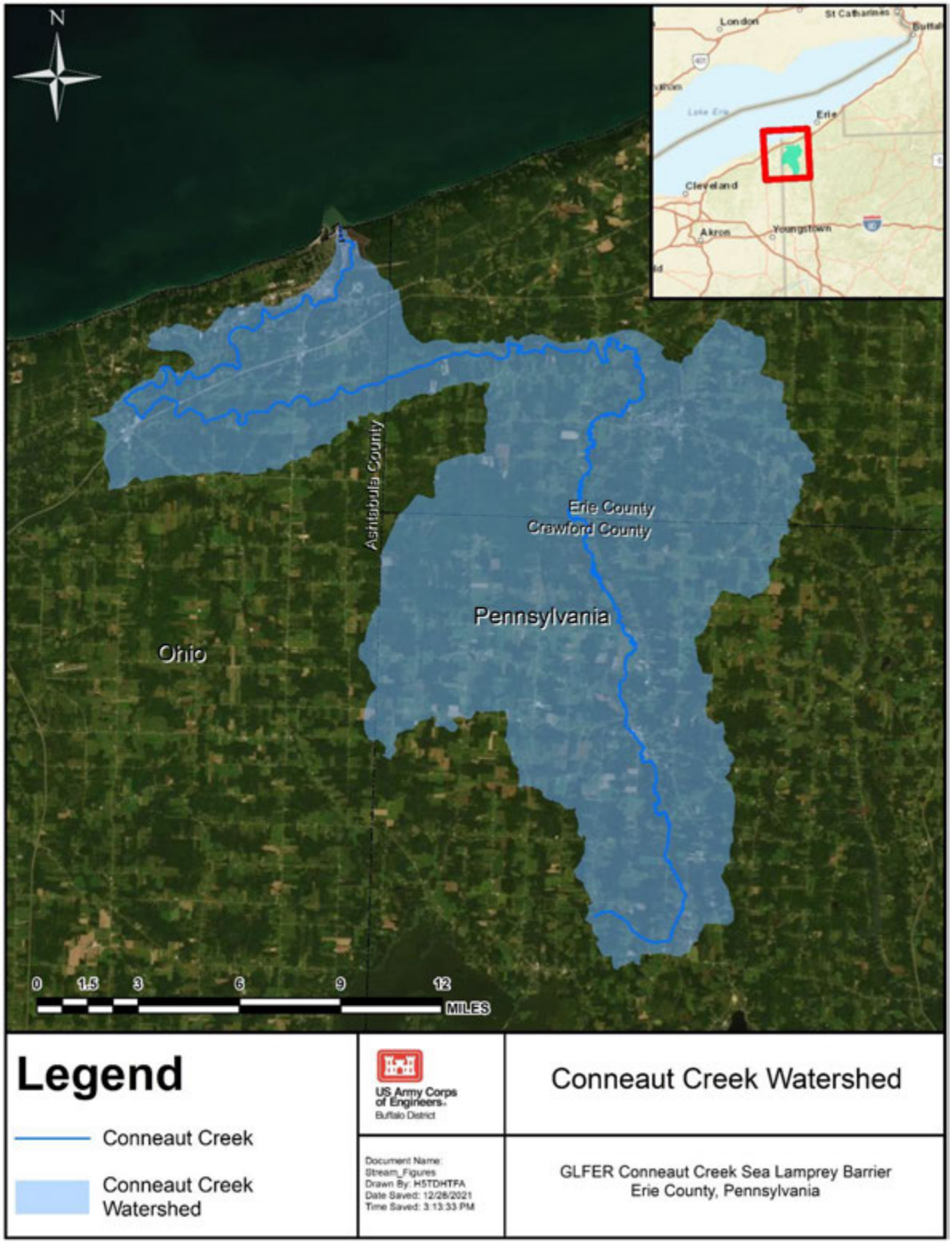

Figure 2. Conneaut Creek Watershed Located in Northeastern Pennsylvania and Northwestern Ohio.

Figure 3. Exposed Shale Bedrock Wall on the Left Bank of Conneaut Creek, Downstream of Route 6N.

Observations made of the floodplain and the riparian zone revealed diverse vegetation with floodplain benches and wetlands transitioning from willows, grasses, and shrubs to mature deciduous forest. Preliminary bed sampling identified large channery cobble sized stones and sandy pools in addition to the exposed bedrock channel bottom. In general, observations moving further upstream favored a slight reduction in stream quality as the stream gradient decreased, with less in-stream structure, a more uniform bed material, and less evident floodplain connections.

Land Use

The Conneaut Creek watershed is primarily forested and agricultural land with little development or industry. The largest developed area is the city of Conneaut at the most downstream extent of the watershed. Conneaut Creek also passes through the small communities of Albion, Springboro, and Conneautville, Pennsylvania. Analysis of land cover data from the Multi-Resolution Land Characteristics (MRLC) Consortium's National Land Cover Database (NLCD) shows the Conneaut Creek watershed to be classified as only 9% developed land in 2019 (NLCD, 2019). The rest of the watershed is classified as 50% forested, 29% pasture or agricultural land, and 12% wetlands/open water.

Figure 4. Conneaut Creek Near Brown Road, Looking Upstream.

Figure 5. Conneaut Creek Near Griffey Road, Looking Upstream.

Analysis of Alternatives

Barrier Criteria

The following criteria were used to evaluate the suitability of each potential barrier location:

- Length of creek protected – Conneaut Creek will still need chemical treatment for sea lamprey post barrier implementation. However, this treatment will occur downstream of the barrier. The further downstream the barrier is located, the less stream miles requiring chemical treatment and more stream miles upstream protected by the barrier. Therefore, site locations further downstream are preferred over sites upstream.

- Structure height required – the USFWS has provided a standard flood event, the 10-year ACE flood event, that the lamprey barrier should be effective until. To achieve this level of protection, the barrier must be effective in blocking the upstream migration of sea lamprey up to the 10-year ACE tailwater elevation plus and an additional 18 inches. The extra 18 inches provides additional separation from the headwater to ensure migration of sea lamprey is blocked at this flood frequency. As the structure height required to meet this 10-year plus 18 inch required increases, the area inundated upstream of the dam at baseflow increases. The locations that minimize barrier height and therefore minimize the baseflow inundation are more preferrable for a barrier.

- Number of parcels impacted – Similar to the inundation, the number of parcels impacted by construction of a barrier at each site was considered. Barrier locations that impact less parcels, both at baseflow and during flood conditions, are preferred.

- Accessibility – The access to barrier locations is an important consideration for construction, real estate implications, operation and maintenance, etc. For these reasons, barrier locations were primarily identified at bridges and roadways. Preferred locations are easily accessible from public roadways and have the least amount of impacts to private property.

Site Selection

Initial Investigations identified 4 potential locations for a sea lamprey control barrier within Pennsylvania portion Conneaut Creek. These sites were Brown Road, Griffey Road, Route 6N, and McKee Road (Figure 6). Sites further upstream were evaluated but determined to be infeasible based on required structure heights and the amount of inundation associated with the structure. The floodplain tends to be wider and the slope of the creek less steep in these upstream reaches, which caused more inundation associated with lamprey barriers.

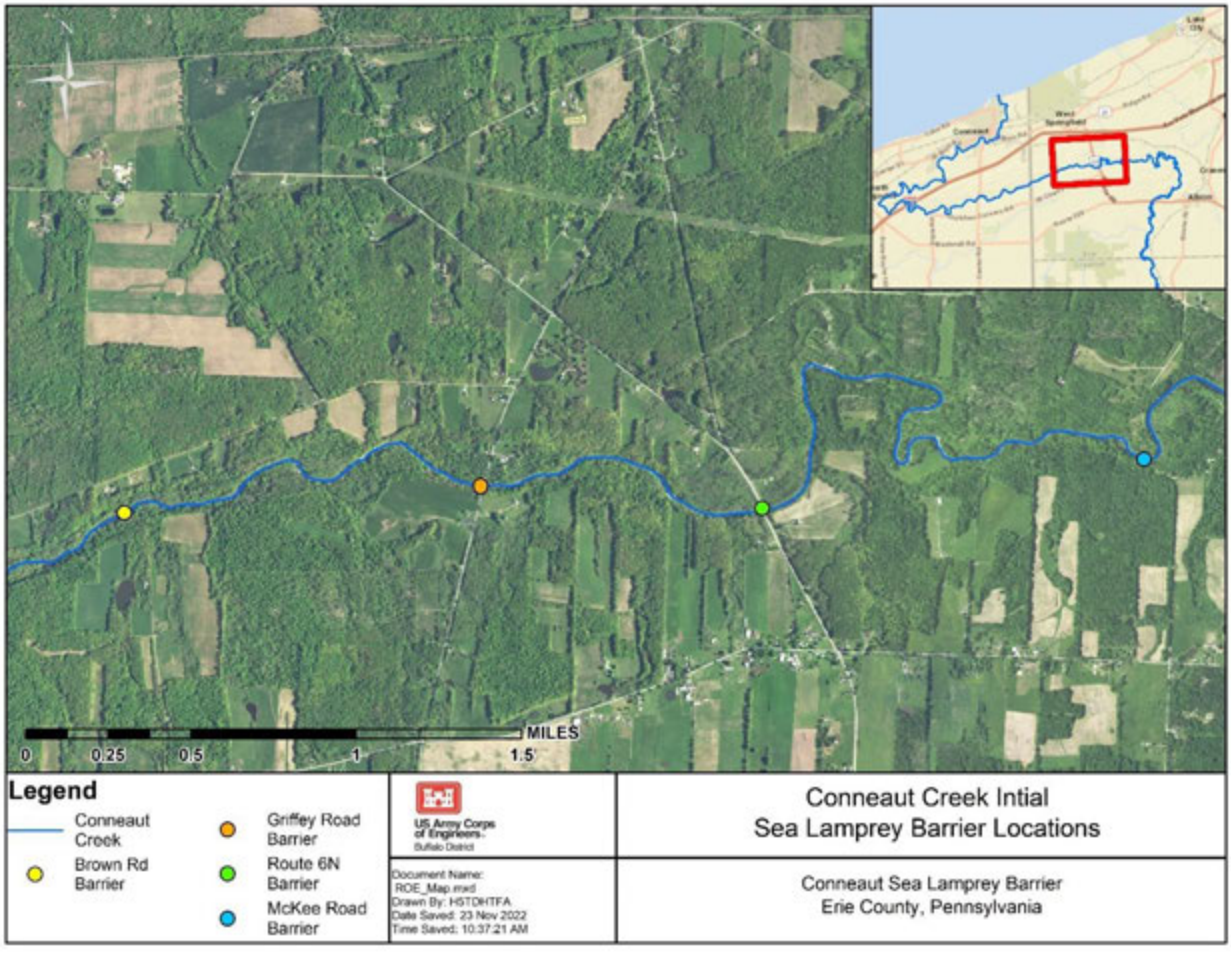

Figure 6. Conneaut Creek Preliminary Sea Lamprey Barrier Locations

After further hydraulic evaluation two sites were determined to be most suitable for the structure: Brown and Griffey Road. See discussion of site selection in Hydraulic Appendix.

Brown Road Site

Brown road is an old road over Conneaut Creek approximately 1.75 river miles from the Pennsylvania/Ohio state line. The bridge no longer exists, but concrete abutments on left and right banks are still in place. A sea lamprey barrier at this location would benefit from using the existing abutments from the original bridge as its own, placing the barrier in between them (Figure 7). The LiDAR data indicates that the high ground on right of bank, presumably the old roadway embankment, is above the 20-year ACE flood elevation and currently acts an encroachment within the floodplain. The left of bank however is much lower and would require fill to create a suitable embankment for the barrier. The condition of the existing abutments and embankments needs to be evaluated and improvements may need to be made to ensure they are suitable function as a barrier. Hydraulic modeling indicates that they are currently loaded under high flow conditions. Brown Road is located the furthest downstream, providing more protection against sea lamprey than other sites on Conneaut Creek in Pennsylvania.

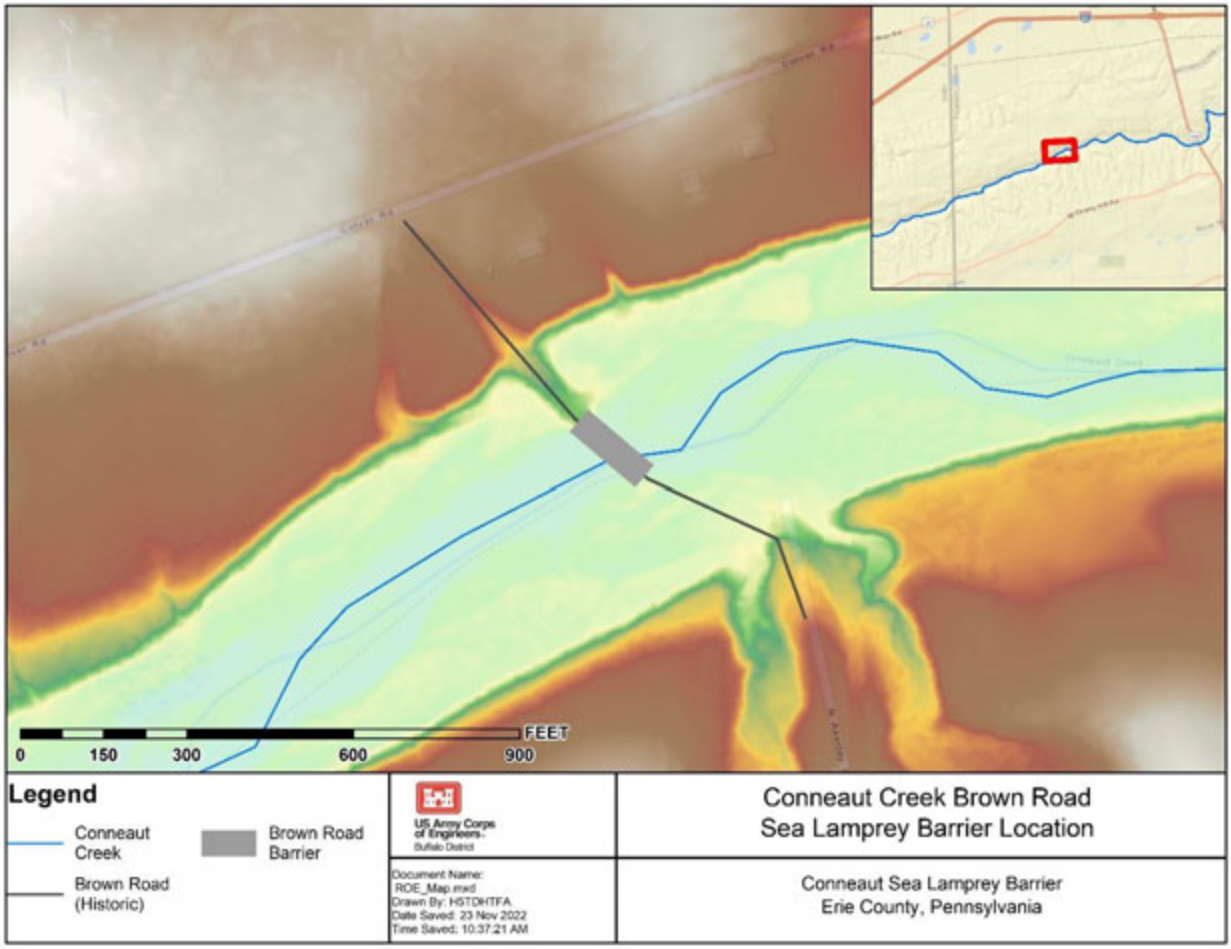

Figure 7. Brown Road Sea Lamprey Barrier Location

Griffey Road Site

The Griffey Road Bridge is located roughly 1.25 river miles upstream from the Brown Road site. A sea lamprey barrier at this site would be placed just downstream of the bridge as shown in Figure 8. The

barrier would utilize the existing bridge abutment on the right of bank and tie into a steep, exposed shale wall on the left of bank. Placing the barrier immediately downstream of the bridge helps minimize flood impacts due to the barrier due to the significant encroachment to the floodplain already created by the Griffey Road bridge. The roadway embankment is loaded during flood events but may need additional protection for seepage or permanent loading at toe of embankment due to a sea lamprey barrier. The parcel downstream of Griffey Road on the right of bank is owned by the project sponsor (PFBC), therefore additional access and real estate benefits may exist at this site.

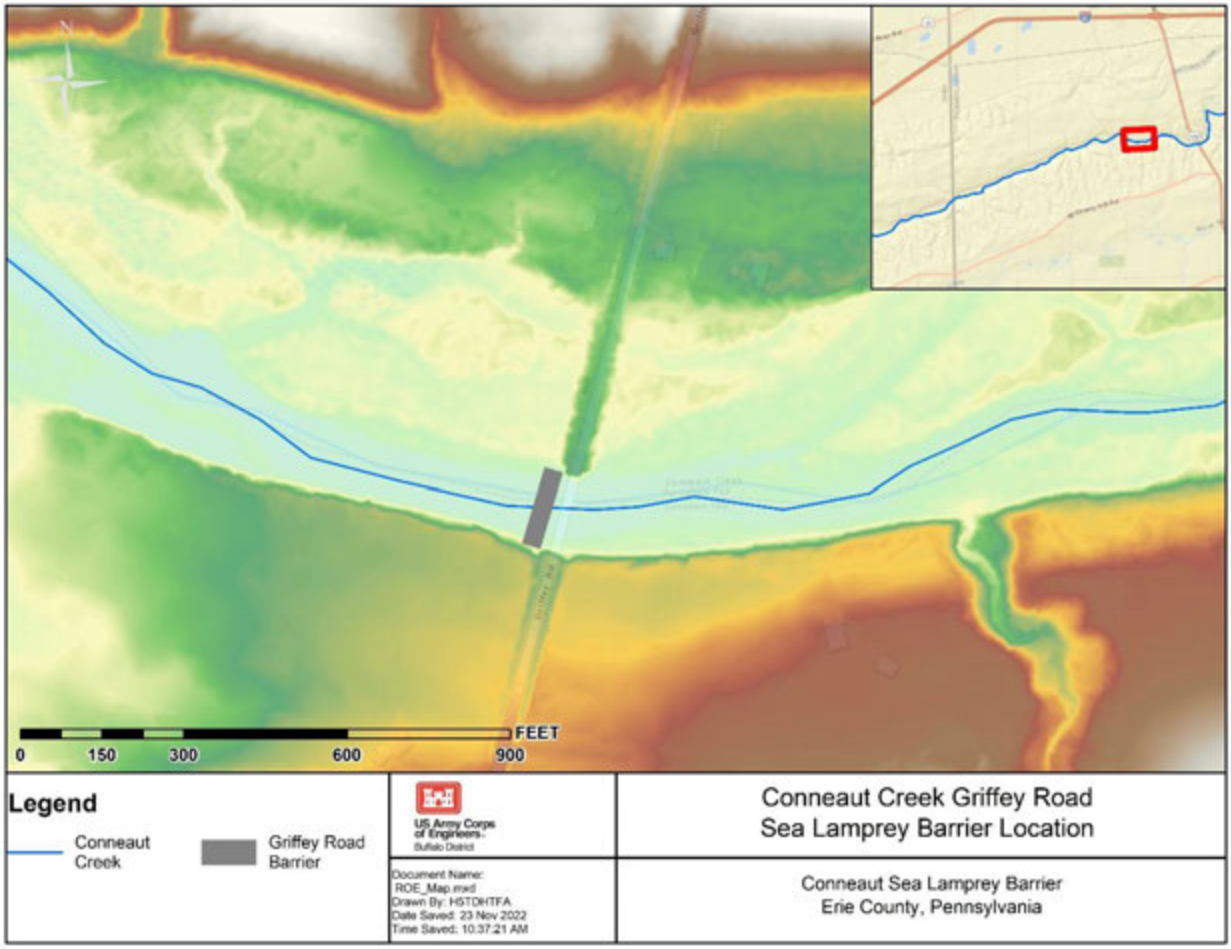

Figure 8. Griffey Road Sea Lamprey Barrier Location

The Griffey Road site has been selected as the most feasible site to construct the barrier.

Sea Lamprey Barrier Alternatives

A focused array of alternatives was developed that identified 5 primary barrier types: high-fixed crest, electrical only, low-fixed crest, Obermeyer adjustable low crest, and Inflatable adjustable low crest. The high-fixed crest barrier alternative was screened out due to the unacceptable amount of inundation that barriers at this height (the 10-yr ACE + 18" - greater than 12') would create. The inflatable adjustable low crest barrier was also screened out due to operability and effectiveness concerns from the project sponsor. The remaining 3 alternatives, low-fixed crest barrier, electrical only barrier, and Obermeyer adjustable low crest barrier were evaluated and modeled.

Low Fixed-Crest Barrier

The low fixed-crest barrier alternative utilizes the weir crest as the primary barrier for sea lamprey migration. Any sea lamprey that reaches the barrier is blocked from migrating upstream. The addition of lip overhanging from the dam crest prevents lamprey from suctioning to the dam face to migrate over the crest. The "low" designation is based on the crest height being less than the 10-year ACE plus 18" elevation (high fixed crest alternative). Low fixed-crest barrier alternatives were modeled using many flow frequencies below the 10-year ACE: the 25%, 10%, 5% and 2% exceedance flows during sea lamprey migration season plus 18", and the 1-year, 1.5-year, and 2-year ACE plus 18".

Since these barriers are designed to a lower flow frequency than the USFWS 10-year ACE plus 18" requirement, a secondary barrier measure is required to prevent lamprey from migrating from the design frequency up until the 10-year ACE frequency. The low fixed-crest barrier utilizes an electrical barrier. Ideally the barrier will be installed laterally on the crest of the weir. The exact location of the barrier will be determined during the detailed design phase. If the electric barrier cannot be place on the crest of the fixed barrier it will be placed on the downstream side if the fixed barrier. When flows exceed the design frequency of the low crest barrier and the 18" of separation between the tailwater and the crest is lost, the electrical barrier is activated, electrifying the water column, and preventing sea lamprey (and other fish species) from migrating upstream over the weir. Figure9 shows the plan and section views of a low fixed-crest barrier.

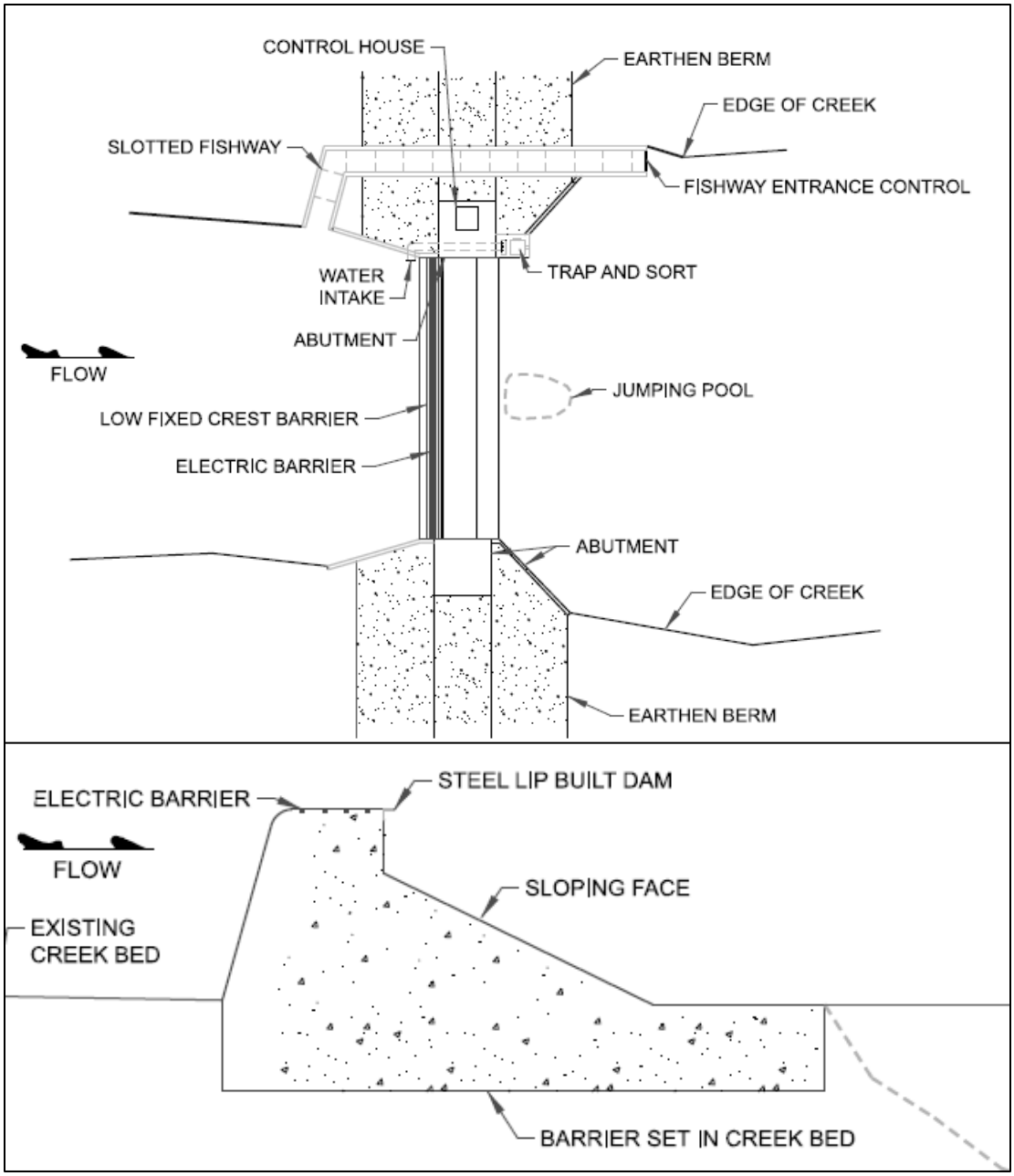

Figure 9. Plan view and profile view of a low-fixed crest/electrical sea lamprey barrier design in Conneaut Creek.

Obermeyer or Adjustable Low Crest Barrier

The Obermeyer or adjustable low crest operates similar to the low-fixed crest barrier, except the barrier can be lowered when not needed to prevent lamprey passage. Outside of lamprey migration season, the Obermeyer barrier is lowered allowing Conneaut Creek to flow freely with no impoundment. During lamprey migration season, the barrier can be raised to maintain at least 18 inches of separation with the tailwater at the design flood condition. Once the Obermeyer is fully raised and the 18 inches of separation is lost, the electric barrier is activated. The Obermeyer could be lowered in these conditions.

This reduces water surface elevation impacts at flows exceeding the barrier design frequency. The electrical barrier location will be determined during the detailed design phase. It may be placed at the top of the adjustable barrier or may need to be installed within the base of the adjustable barrier structure. Operational feedback received to this point indicates that the barrier will likely be left in place throughout the lamprey migration season. This minimizes risk of bypass and limits operational costs. The Obermeyer barrier will also include braces so that the barrier is not reliant on inflatable air bags to maintain the crest height. The downstream side of the barrier will also include netting or grating to prevent fish mortality in the area under the barrier. Figure 10 shows the plan and section of the Obermeyer barrier without bracing and netting.

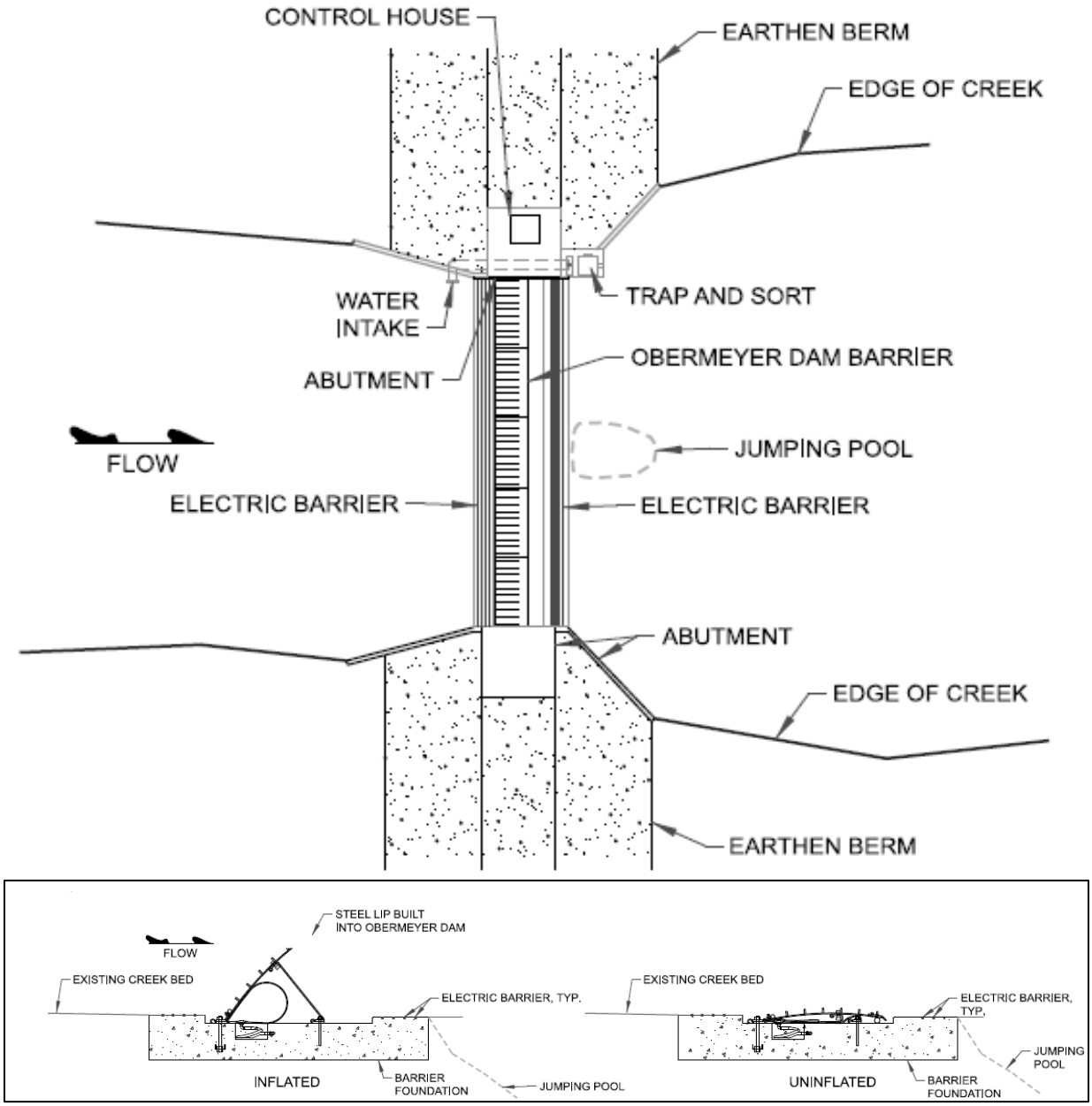

Figure 10. Plan view and profile view of an Obermeyer adjustable low crest sea lamprey barrier design in Conneaut Creek.

Electrical Only Barrier

The electrical barrier operates without a raised crest and will have little to no impacts to WSE upstream at all flows. A flat concrete sill across channel invert is constructed with the electrical barrier installed along the top. As the primary barrier, the electricity is required to be activated at all times throughout the sea lamprey migration season, as opposed to the other two alternatives where the electrical barrier was only activated as a secondary measure once 18 inches of separation between the tailwater and crest is lost. Figure 11 shows a plan and section view of the electrical only barrier alternative.

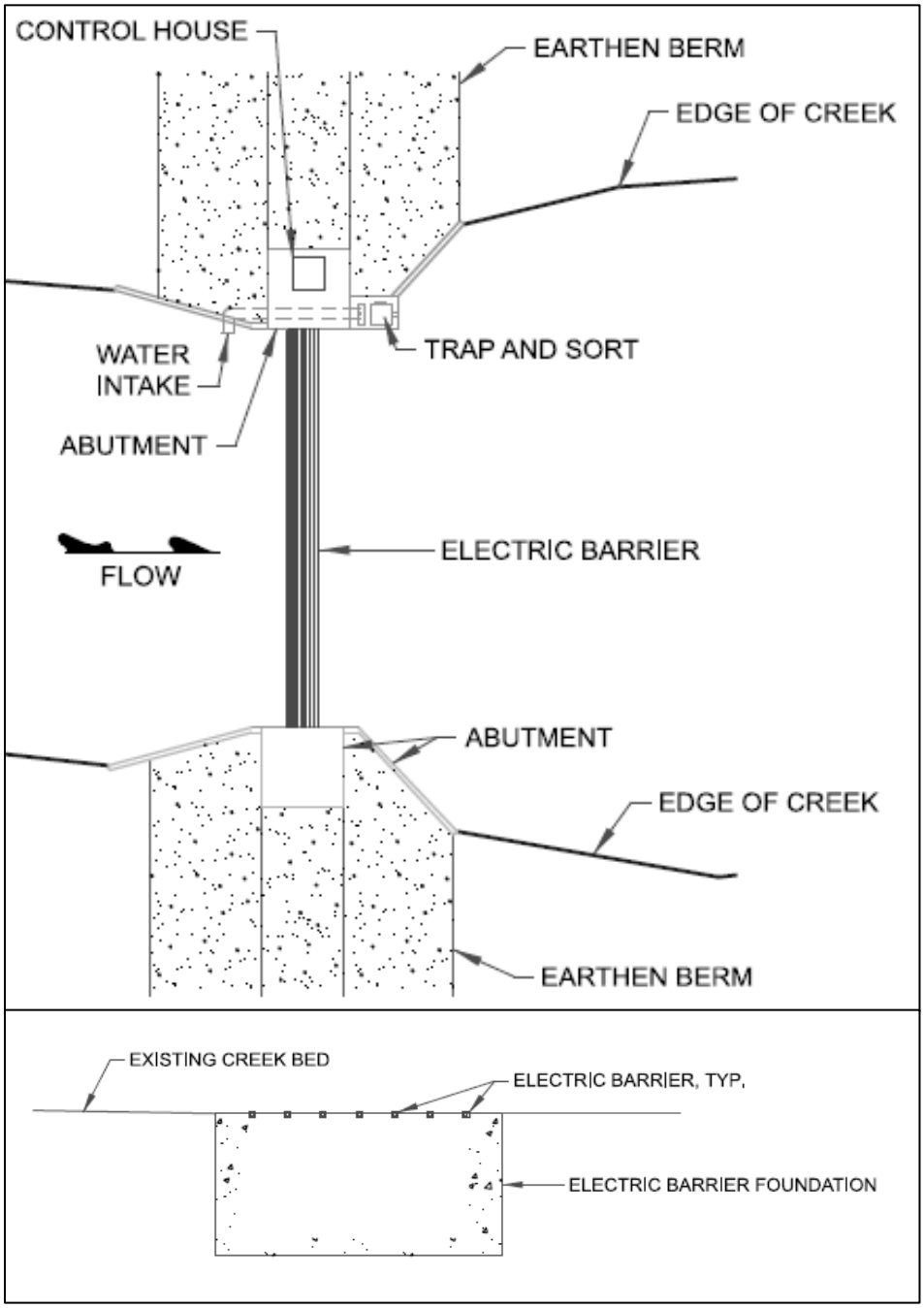

Figure 11. Plan view and profile view of an electrical only sea lamprey barrier design in Conneaut Creek.

The Obermeyer or adjustable low crest barrier in combination with an electric barrier has been selected as the preferred alternative. See Figure 12 for a concept plan of the barrier at the Griffey Road site.

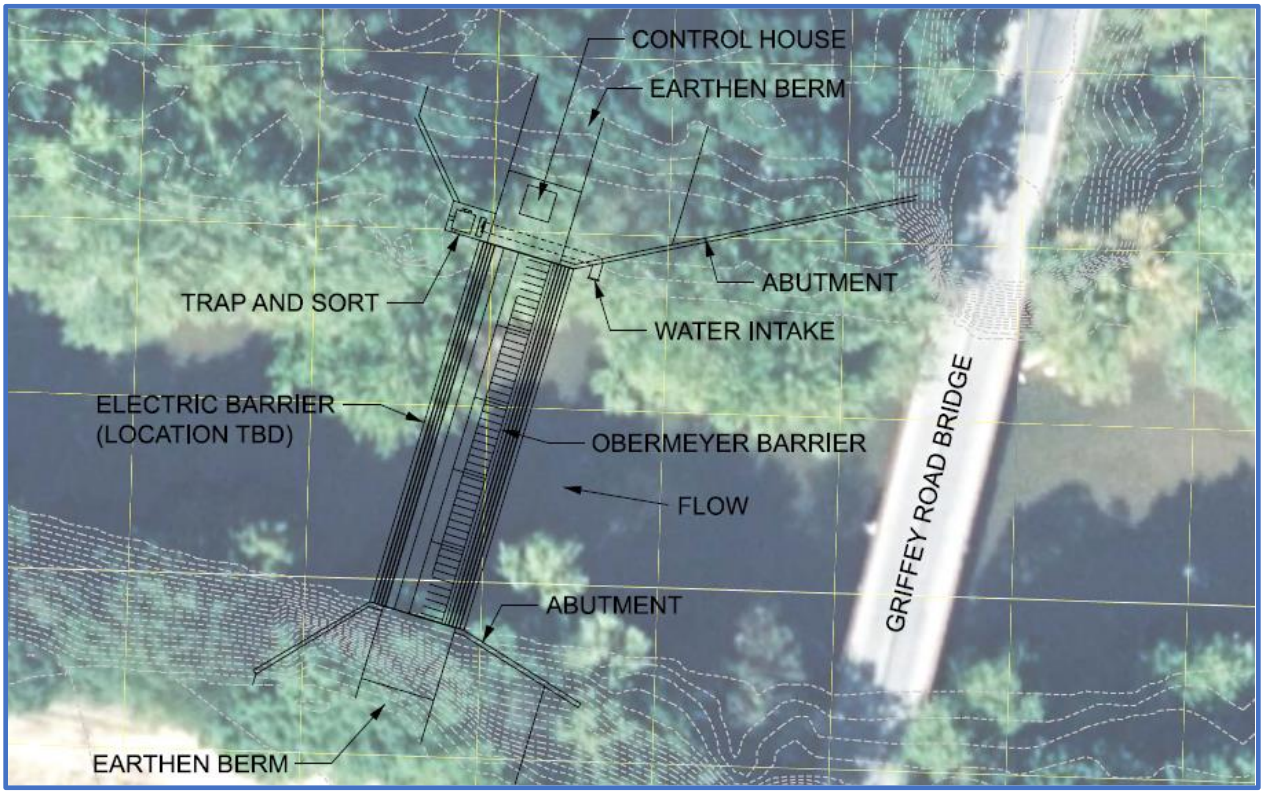

Figure 12: Concept View of TSP at Griffey Road.

Fish Passage Alternatives

Fish passage is a critical feature of each barrier considered in Conneaut Creek. Most significantly, Conneaut Creek is home to a large Steelhead Trout run from Lake Erie extending upstream of the potential barrier locations. Fish passage must be implemented for the project to ensure Steelhead and other native fish species are able to move upstream past the sea lamprey barrier. The primary method of passage will be trap and sort. This allows for both fish and sea lamprey to enter the trap, where the lamprey are removed, and native fish allowed to continue upstream. Removing the lamprey not only prevents them from accessing spawning territory upstream of the barrier, but also stops them from potentially finding spawning success downstream as well. The trap requires manual sorting by personnel during the lamprey spawning run (March – June). Outside this season, the trap can be removed so no sorting is required, and fish are free to move upstream.

In order for fish to move upstream past a barrier, a fishway will be required in conjunction with a trap and sort design. Potential fishway types utilized on Conneaut creek include vertical slot, denil, and nature-like bypass fishways. A denil fishway design uses angled baffles within a steep sloped ramp. The baffles dissipate the kinetic energy of flow and allow fish to move upstream through the denil. These fishway types are usually used for steep slopes and therefore require less length and a smaller footprint. Vertical slot fishways utilize a series of pools with slotted entrances to each pool that extend to the bottom of the fishway channel. This accommodates a variety of fish and other aquatic species to move upstream through the slots and rest in the pools. Nature-like bypass fishways are a constructed channel designed to mimic a typical instream habitat and channel characteristics. The sloped channel design utilizes stepped pools created by weirs or boulders to allow fish to move upstream. These fishways require shallower slopes and therefore require more length and a larger footprint.

The preferred fish passage design is discussed in more detail in the hydraulic appendix. The particular fish passage feature will be determined during the detailed design phase.

Tentatively Selected Plan - Summary

Site - Site selected is the Griffey Road location just downstream of the bridge over Conneaut Creek. See figure 12. This location has a shale creek bottom that is expected to be excavatable by typical construction equipment. The site is accessible from right side bank from property owned by the State of Pennsylvania. This allows for permanent access to one side of the barrier. The left side bank is owned by an individual amenable to the project. These factors along with the hydrology discussed in the hydraulic appendix make this the most feasible site for the lamprey barrier. Further investigations related to the soil and rock on site will be conducted during the detailed design phase for this project.

Barrier Type – An Obermeyer or adjustable crest barrier in combination with electric barrier is the selected alternative. Several factors were weighed in making this selection and are described in detail through this report. During the detailed design phase, the design team will consider the best location for the electric barrier, measures to prevent fish mortality under the adjustable crest barrier, and bracing details for the adjustable crest to ensure the barrier functions as intended. It is likely that parasitic electrical arrays will be needed on each side of the new barrier to prevent stray current from causing corrosion on nearby structures and utilities. The need to use these arrays will be determined during detailed design.

Barrier Height – The Obermeyer or adjustable crest barrier will be approximately 5 feet in height above the current creek bed. This is based on hydraulic modeling. See further discussion in the hydraulic appendix.

Barrier Width – The barrier will be roughly 110 feet wide not including the abutments at each bank. The intent is for the barrier to match the existing bank to bank width of the creek at the selected location. A sample sketch of the assumed abutments are included as Sheets 103, 301 and 302 for the north and south L-wall abutments.

Type of fish passage – Trap and sort will be used to pass fish and remove lamprey. A slotted fishway will also be considered during the detailed design phase. Currently the plan is to not include a fishway for fish passage. The barrier will be lower to approximately match the current creek bottom when lamprey are not running upstream. This will allow other fish species to pass the barrier during different times of the year. A jumping pool may also be included with the barrier. The size and effectiveness of a jumping pool will be investigated during the detailed design phase.

Portage – Conneaut Creek is used for paddle sports and portage features will be looked at during the detailed design phase. The current plan is for users to pull out of the water before reaching the barrier, make their way up to the road, cross Griffey Road and then return to the creek. Features such as ramps, stairs, etc. will be considered.

A1 PLAN OF PROPOSED BERM AND EXCAVATION
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MARK	DESCRIPTION	DATE

ISSUE DATE: FEBRUARY 2024
SOLICITATION NO.:
CONTRACT NO.:

DESIGNED BY: PDT
DRAWN BY: G.GALUSZKA
CHECKED BY: D.TELLINGHUISEN
SUBMITTED BY:
SIZE: ANSI D

U.S. ARMY CORPS OF ENGINEERS
BUFFALO DISTRICT
478 MAIN STREET
BUFFALO, NY 14202

LAMPREY BARRIER
CONNEAUT CREEK
WEST SPRINGFIELD, PA

PLAN OF PROPOSED BERM AND EXCAVATION

SHEET ID
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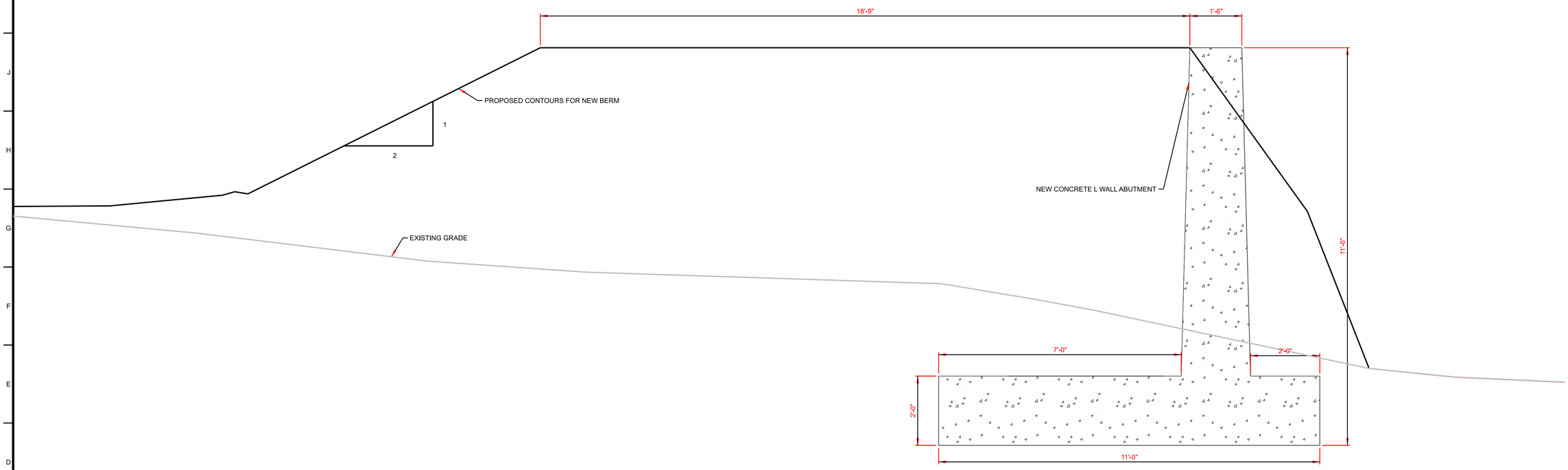

C1 NORTH ABUTMENT SECTION

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BUFFALO DISTRICT
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BUFFALO, NY 14202

LAMPREY BARRIER
CONNEAUT CREEK
WEST SPRINGFIELD, PA

NORTH ABUTMENT SECTION

SHEET ID

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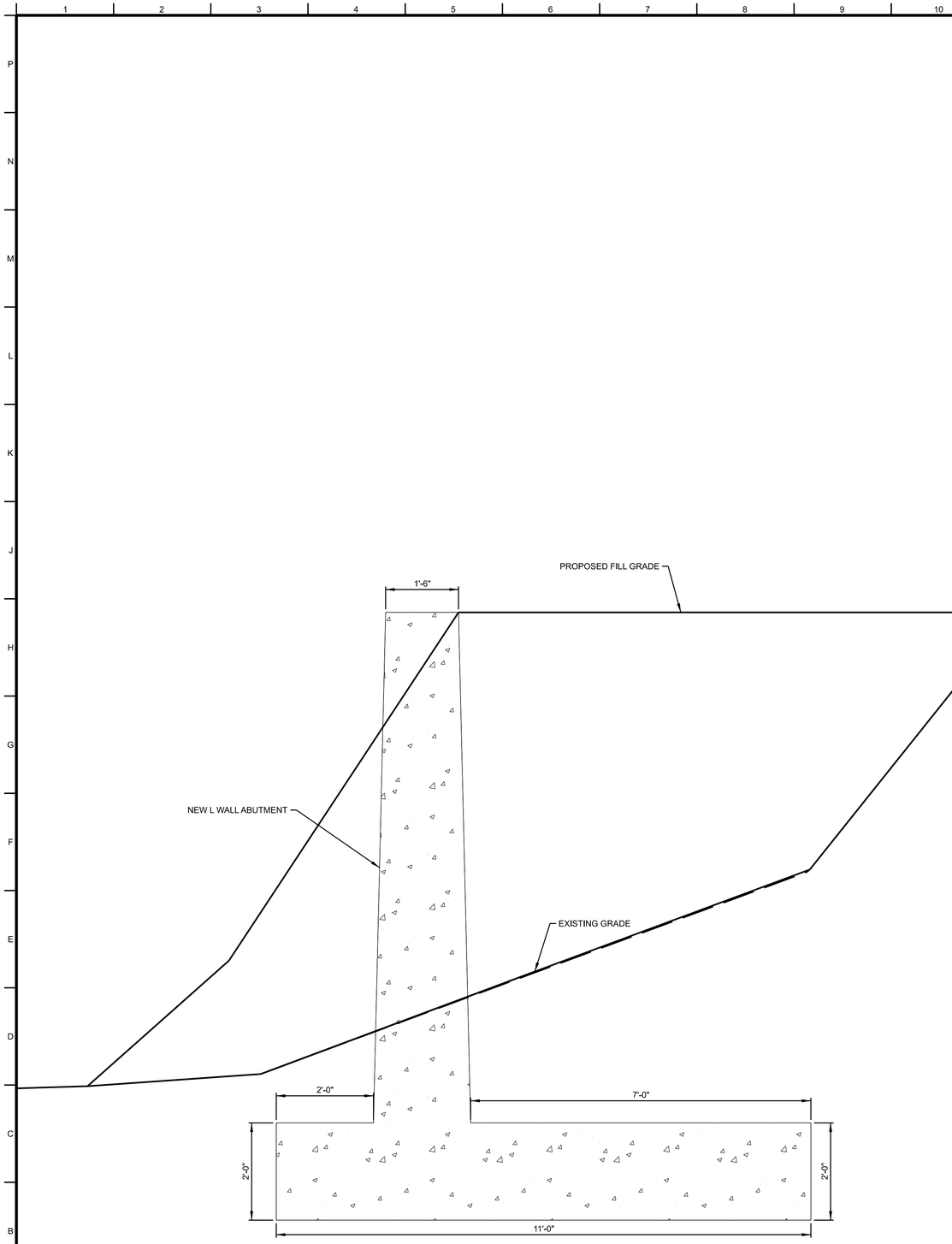

B1 NEW SOUTH ABUTMENT SECTION

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CONTRACT NO.:
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BUFFALO, NY 14202

LAMPREY BARRIER
CONNEAUT CREEK
WEST SPRINGFIELD, PA

NEW SOUTH ABUTMENT SECTION

SHEET ID

C-302

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CONNEAUT CREEK SEA LAMPREY BARRIER PROJECT
P2# 495058

Section 506 – Water Resources Development Act of 1992, as amended Great Lakes Fishery and Ecosystem Restoration

Erie County, Pennsylvania

Appendix A-2:
Hydrology & Hydraulic Engineering

Climate Preparedness and Resiliency

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Acronym List

ACE – Annual Chance Exceedance

CFS – cubic feet per second

DEM – Digital Elevation Model

GLFC – Great Lakes Fishery Commission

HEC-RAS – Hydrologic Engineering Center River Analysis System

FIRM – Federal Insurance Rate Map

FIS – Flood Insurance Study

NAVD88 - North American Vertical Datum of 1988

NLCD – National Land Cover Database

ODNR – Ohio Department of Natural Resources

PFBC – Pennsylvania Fish and Boat Commission

POR – Period of Record

TSP – Tentatively Selected Plan

USACE – United States Army Corps of Engineers

USFWS – United Sates Fish and Wildlife Service

USGS – United States Geological Survey

WSE – Water Surface Elevations

1. Introduction

Conneaut Creek, located in Northeast Ohio and Northwest Pennsylvania, is a known sea lamprey spawning stream. Currently lampricide is deployed to help control and reduce sea lamprey populations in Conneaut Creek, Lake Erie, and the rest of the Great Lakes. This feasibility report by the United States Army Corps of Engineers (USACE), in coordination with the Great Lakes Fishery Commission (GLFC), United States Fish and Wildlife Service (USFWS), Pennsylvania Fish and Boat Commission (PFBC), Pennsylvania Department of Environmental Protection (DEP), and Pennsylvania Sea Grant, developed barrier alternatives intended to reduce the use of lampricide and increase the efficiency of sea lamprey control within Conneaut Creek. The objective of this appendix is to summarize the hydrologic and hydraulic analyses performed, document data and key assumptions, describe sea lamprey barrier alternatives considered, and compare existing conditions in Conneaut Creek to the alternatives considered.

2. Hydrology

2.1 Watershed Description

The Conneaut Creek watershed is oriented primarily north to south in the upper corners of Northwestern Pennsylvania and Northeastern Ohio (Figure 1). The main stream in the basin, Conneaut Creek, is a direct tributary to the Great Lakes watershed where it drains 191 square miles into Lake Erie at the city of Conneaut, Ohio. The creek drains 153 square miles in Crawford and Erie County, Pennsylvania and 38 square miles in Ashtabula County, Ohio. The mainstem of Conneaut Creek is approximately 68 miles from its headwaters to the confluence with Lake Erie. Major tributaries to Conneaut creek include Stone Run, Temple Creek, Mud Run, Fish Creek, and East and West Branch Conneaut Creek. No dams currently exist on the mainstem Conneaut Creek, with all 68 miles free flowing to Lake Erie.

Conneaut Creek and its associated tributaries exemplify high quality stream habitat and high biological species diversity. The watershed can be characterized by extensive forested stream corridors and overall good water quality. Additionally, the watershed provides an important fishery of local and statewide importance.

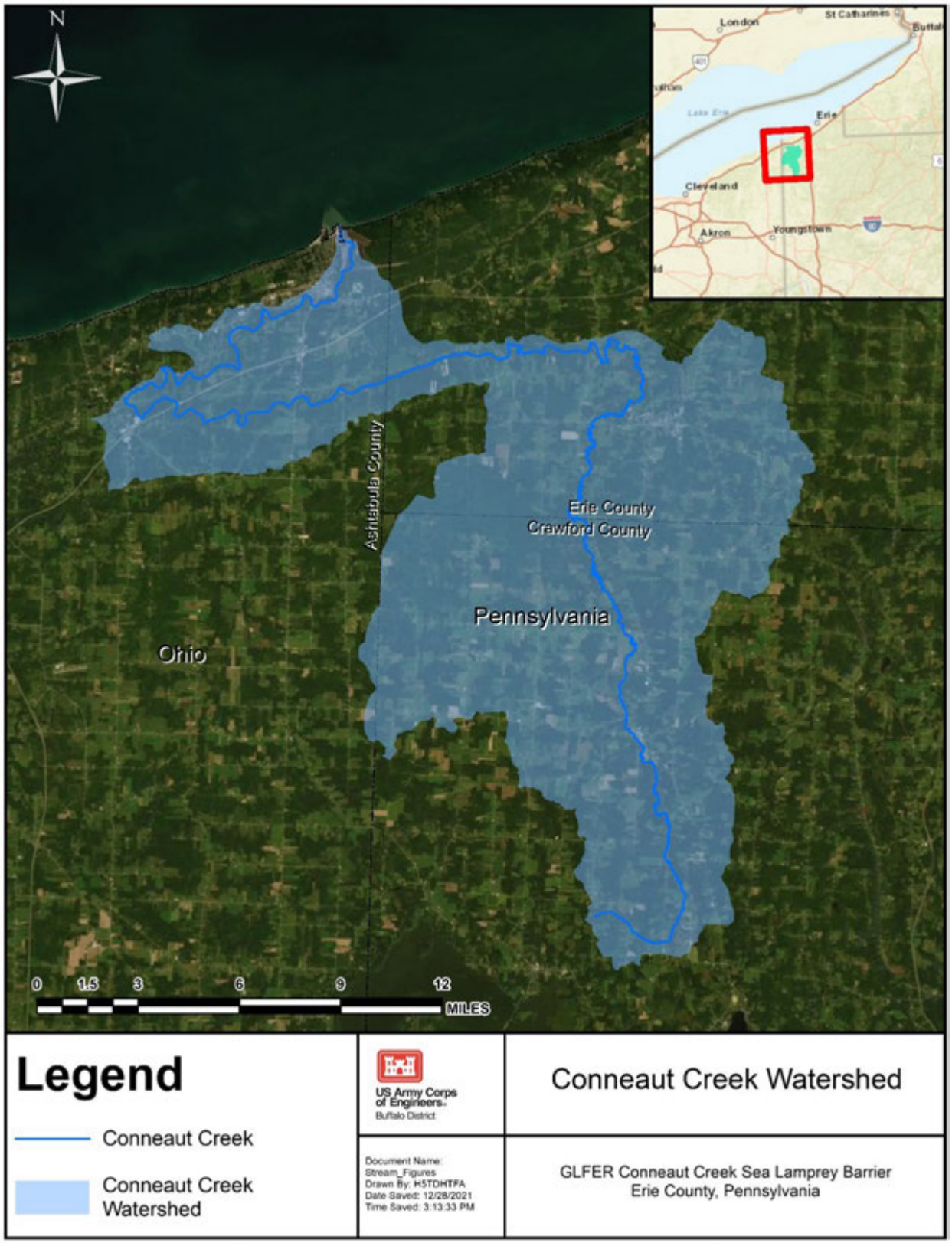


Figure 1. Conneaut Creek Watershed Located in Northeastern Ohio and Northwestern Pennsylvania.

2.2 Soils and Geology

The Conneaut Creek watershed extends from the lake plain of Lake Erie into sloping upland south of the lake. The bedrock of the watershed is classified as Devonian age shale, underlaying layers of clay and silt soils (Taylor, 1960). A profile of the geologic formations beneath the Conneaut basin is shown in Figure 2 (Pree, 1960). The upland portion of Conneaut creek, which consists of all of the Pennsylvania portion of the watershed and part of the Ohio portion, is formed from an end moraine, where soils are classified as Ashtabula till: a silty clayey till from the lake region (Roloson, 2005).

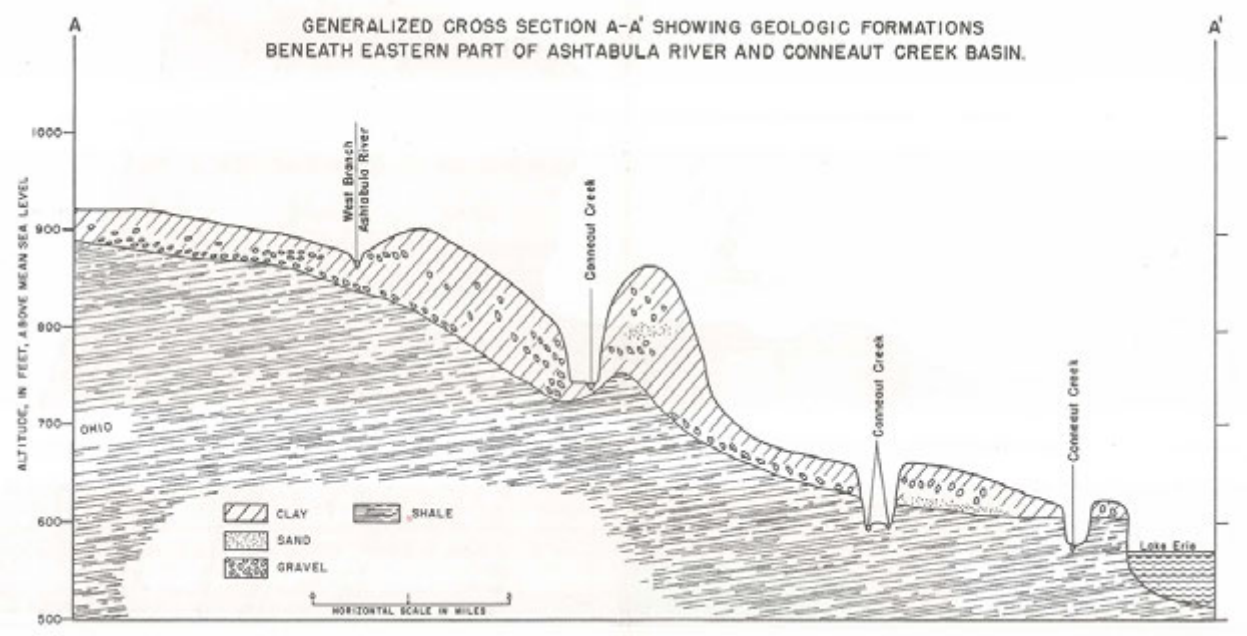


Figure 2. Conneaut Creek Basin Cross Section Showing Geologic Formations (Pree, 1960)

Conneaut Creek lies within a relatively narrow and steep valley cutting through layers of shale that define the valley walls (Figure 3). The upper reaches of the river exhibit a shallower gradient and wider floodplain than lower reaches, where at about river mile 28 the gradient of the creek becomes steeper and the valley well defined. Exposed shale bedrock can be observed in many areas of the creek, particularly downstream of river mile 28, with well-defined pool-riffle structure and excellent floodplain access.

Figure 3. Exposed Shale Bedrock Wall on the Left Bank of Conneaut Creek, Downstream of Route 6N.

Observations made of the floodplain and the riparian zone revealed diverse vegetation with floodplain benches and wetlands transitioning from willows, grasses, and shrubs to mature deciduous forest. Preliminary bed sampling identified large, channery-like, cobble sized stones and sandy pools in addition to the exposed bedrock channel bottom. In general, observations moving further upstream favored a slight reduction in stream quality as the stream gradient decreased, with less in-stream structure, a more uniform bed material, and less evident floodplain connections.

2.3 Land Use

The Conneaut Creek watershed is primarily forested and agricultural land with little development or industry. The largest developed area is the city of Conneaut at the most downstream extent of the

watershed. Conneaut Creek also passes through the small communities of Albion, Springboro, and Conneautville, Pennsylvania. Analysis of land cover data from the Multi-Resolution Land Characteristics (MRLC) Consortium's National Land Cover Database (NLCD) shows the Conneaut Creek watershed to be classified as only 9% developed land in 2019 (NLCD, 2019). The rest of the watershed is classified as 50% forested, 29% pasture or agricultural land, and 12% wetlands/open water. Figure 4 shows the spatial distribution of characterized land use within the watershed. This data also shows a less than 0.5% change to developed land from 2001 to 2019.

The sparse development within the watershed benefits the riparian habitat and in-stream conditions of Conneaut Creek, both of which are considered high quality. From the NLCD data, approximately 84% of the Federal Emergency Management Agency (FEMA) Zone A floodplain, which represents the approximate 1% Annual Chance Exceedance (ACE) floodplain, is classified as forested or wetlands (48% forest, 36% wetland). Only 4% of the floodplain is developed and the remaining 12 percent is pasture/agricultural land. The high-quality riparian zone and stream corridor was identified not only from landcover and aerial imagery data analyses, but also field observations of the creek. Figure 5 and Figure 6 show stream conditions within the watershed several miles upstream from the Ohio-Pennsylvania border. Additionally, 21 miles of the 24.5 miles of Conneaut Creek within Ohio have received state scenic river designation and of the 21 scenic river miles, 16.4 are designated as wild (ODNR, 2021).

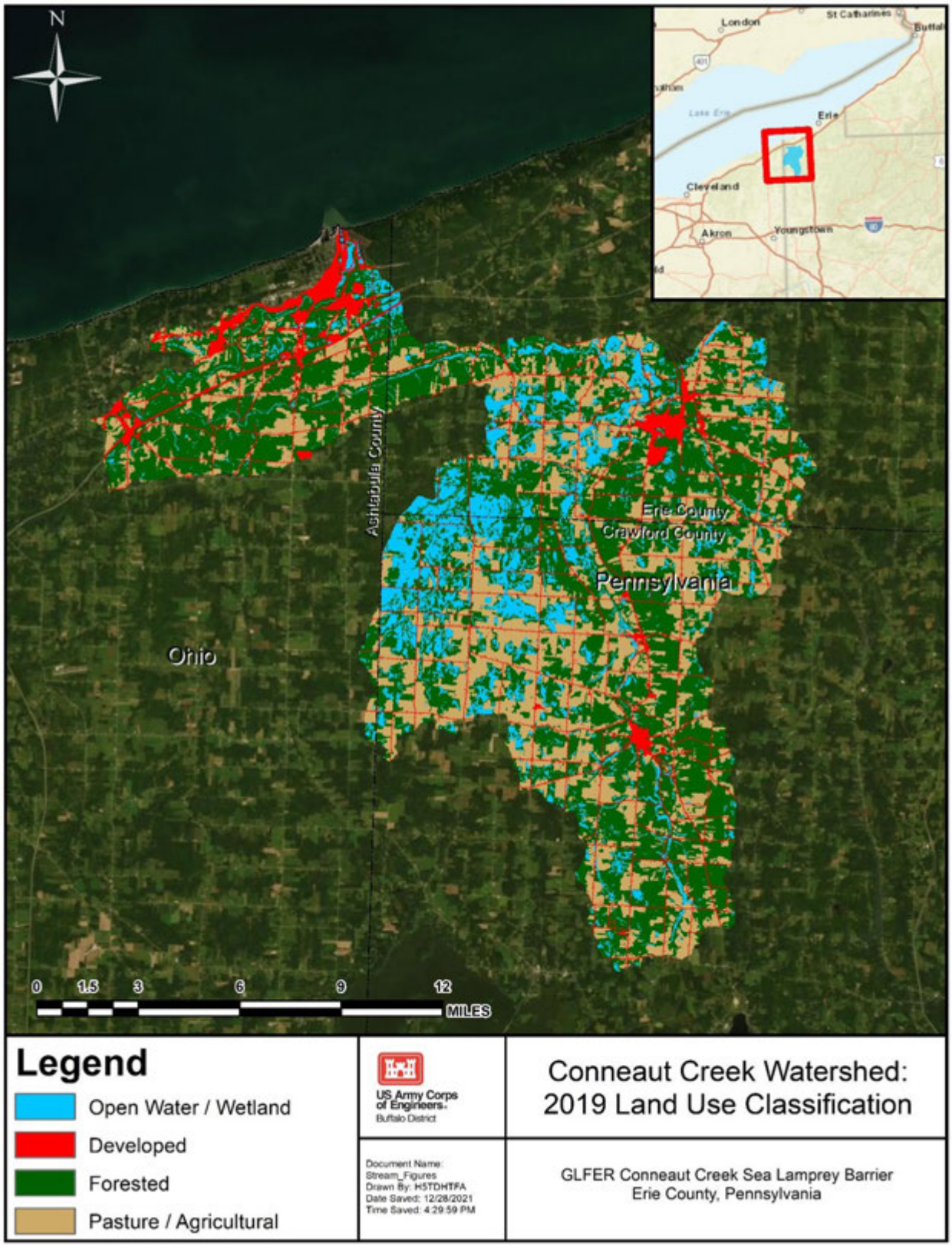


Figure 4. Land Use Classification Within the Conneaut Creek Watershed.

Figure 5. Conneaut Creek Near Brown Road, Looking Upstream.

Figure 6. Conneaut Creek Near Griffey Road, Looking Upstream.

2.4 Climatology

The climate in the Conneaut Creek watershed is largely influenced by the proximity to Lake Erie, experiencing warm summers and cold winters. High summer temperatures are around 80°F and winter low temperatures around 18°F. Average annual temperature is approximately 50° F (NRCC, 2021). The Conneaut Creek watershed experiences 40 – 45 inches of precipitation yearly, and over 100 inches of snowfall per year (NRCC, 2021). A climate change assessment was performed for the Conneaut Creek watershed summarizing the past and projected climate within the watershed (see Climate Change Analysis below).

2.5 Floodplains & Flooding

The largest flood of record on Conneaut Creek occurred on January 22, 1959, where 17,000 cfs was recorded at the Conneaut Creek gage with a resulting gage height of 11.70 feet. This event can be described as larger than the 1% ACE (100-year frequency event) today. However, this gage height was only the second highest on record; a gage height of 12.94 ft was recorded on March 04, 1934. It is noted that this height was affected by backwater, presumably from a very high lake stage at Lake Erie.

A FEMA Flood Insurance Study (FIS) was conducted for the city of Conneaut with a Flood Insurance Rate Map (FIRM) illustrating the Zone AE floodplain. A floodplain marked as “Zone AE” denotes a detailed hydraulic study has been performed to determine the 1% ACE floodplain and floodway along with 0.2% ACE (500-year frequency) floodplain. Upstream of this study, the majority of the floodplain within the watershed is marked as “Zone A” as no detailed studies have been performed and the 1% ACE floodplain is determined using approximate methods. Other small portions of Conneaut Creek with Zone AE delineated are the communities of Springboro and Conneautville. Figure 7 shows the FEMA 1% ACE floodplain within Conneaut Creek.

Given the largely undeveloped watershed and floodplain, significant damages from extreme storm events on Conneaut Creek are unlikely. Large portions of Conneaut Creek are contained within the steep carved out valley, containing all the flood flow in a relatively narrow floodplain. The likelihood of flood impacts increases upstream, where the channel slope decreases, and the floodplain widens. Farm fields and even a few dwellings are visible within the FEMA Zone A floodplain in the upper reaches. In addition to the increased flooding hazard from high lake levels, reports for potential ice jam flooding at bridges in the city of Conneaut have also been issued. Due to the degree of forested floodplain, floatable debris jams at bridges could also be a flooding hazard within the watershed.

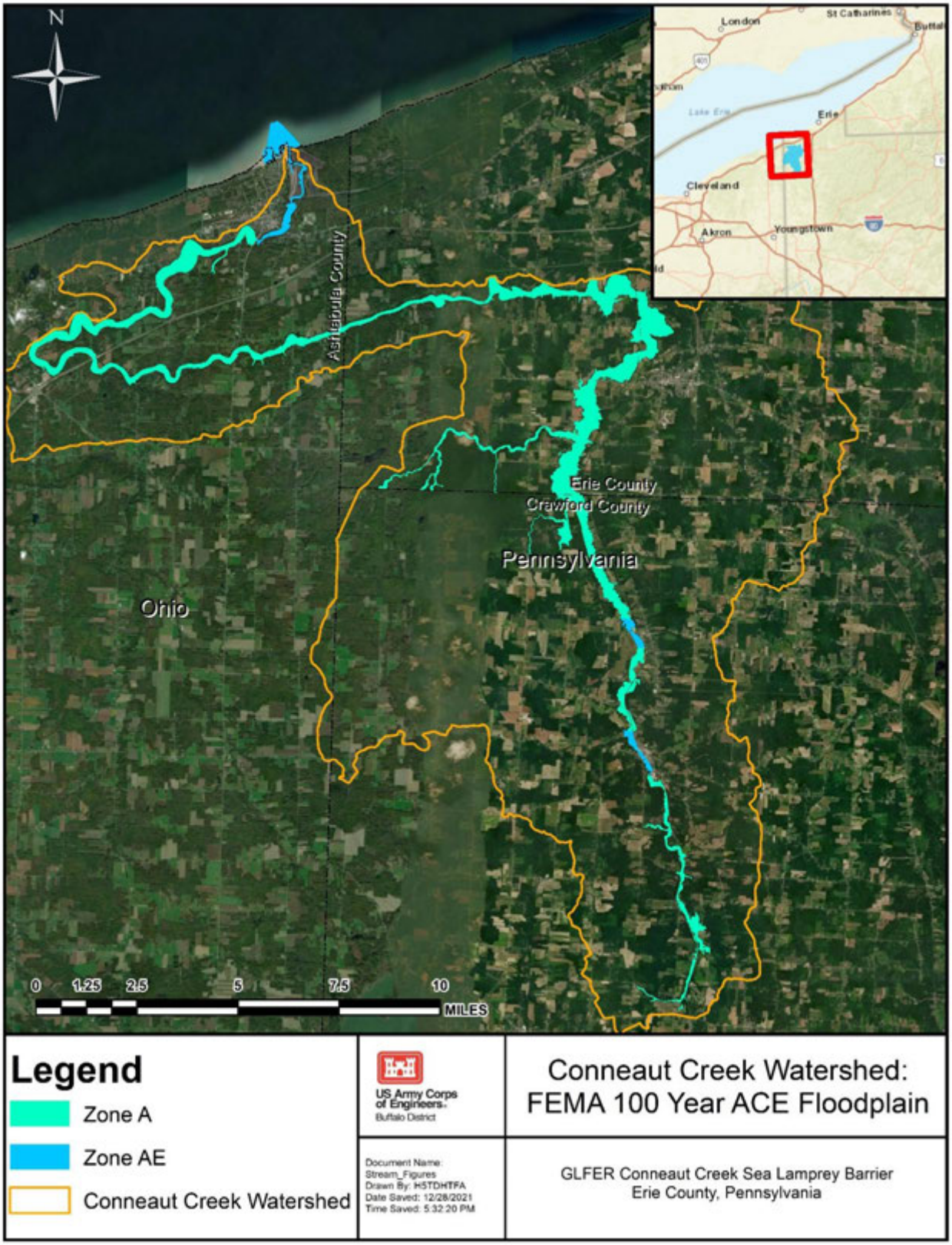


Figure 7. FEMA 1% ACE (100-Year) Floodplain Zones along Conneaut Creek.

2.6 Flow Frequency

A USGS stream gage, USGS 04213000 Conneaut Creek at Conneaut OH, is located on Conneaut Creek at Keefus Road in the city of Conneaut with a drainage area of 175 square miles (Figure 8). Using this stream gage, a hydrologic analysis for the Conneaut Creek was performed using USGS Bulletin 17C log-Pearson Type III distribution (England, 2018). The gage has 85 years of peak flow data on Conneaut Creek from 1923 to 2020, with a gap in the data from 1936-1950.

A climate change analysis for Conneaut Creek found a statistically significant downward trend in streamflow from 1950 to 2020 (see 7.3 First-order Statistical Analysis: Site Specific Trends and Non-Stationarity Detection). Despite this trend, the full period of record (POR) was used to perform hydrologic analysis as resulting flow frequencies are more conservative for designing the sea lamprey barrier. That is, if flow frequencies decrease over time, designing a barrier to the full POR flow frequencies will provide higher protection.

The resulting Bulletin 17C ACE flows at the gage were used to estimate the peak flows at ungaged project sites upstream, in accordance with Koltun, 2019. The resulting ACE flows for Conneaut Creek at the USGS gage and upstream near the Pennsylvania-Ohio state line and near Route 6N are shown in Table 1. These flow frequencies were used in the HEC-RAS model as flow change locations.

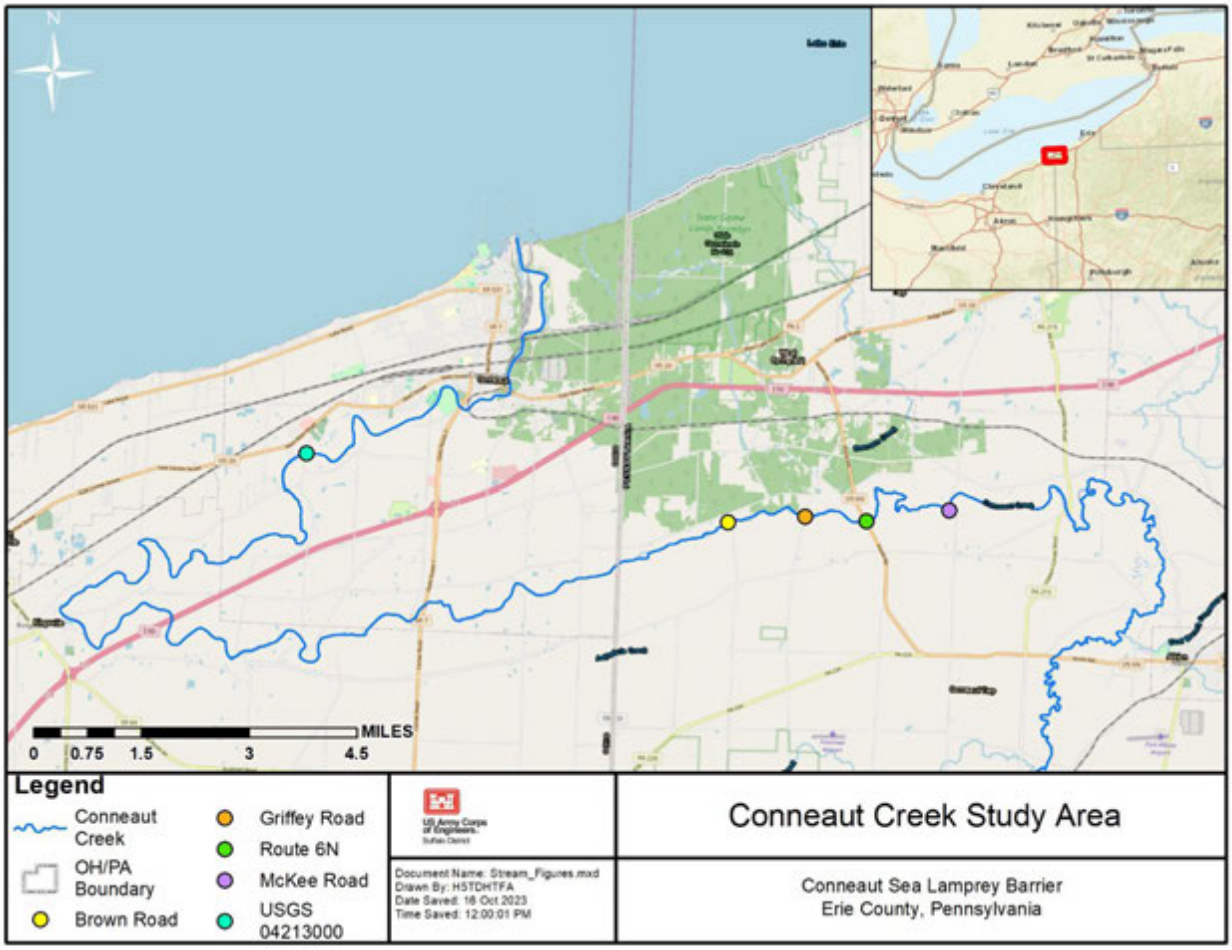


Figure 8. USGS Gage 04213000 Conneaut Creek at Conneaut OH Location Relative to the Study Areas

Table 1. Computed Annual Chance Exceedance Flows at USGS 04213000 and Conneaut Creek near Griffey Road.

Annual Chance Exceedance (Recurrence	Computed Flow at Conneaut Gage (ft^3/s)	Computed Flow at PA/OH State Line	Computed Flow at PA Route 6N (ft^3/s)
50% (2 Year)	5,942	4,999	4,897
20% (5 Year)	8,579	7,340	7,230
10% (10 Year)	10,330	8,945	8,842
4% (25 Year)	12,550	10,995	10,910
2% (50 Year)	14,120	12,559	12,495
1% (100 Year)	15,840	14,109	14,069
0.2% (500 Year)	19,670	17,813	17,813*
*Regression equations produced a slightly higher flow (17,844 cfs) at PA Route 6N than at PA/OH State			

Percent exceedance flows during the sea lamprey migration and steelhead migration seasons were also calculated. The percent exceedance flow is the flow rate that is exceeded X percent of the time in a selected period, in this case migration seasons. Sea lamprey migration season was defined from March 1st to July 31st and steelhead migration season from August 1st to February 28th. These flows were used to develop barrier and fishway designs.

Sea Lamprey migration percent exceedance flows were incorporated into the HEC-RAS model to inform barrier height requirements based on WSE's at particular percent exceedances and locations. Figure 9 and Figure 10 show the log distribution of the percent exceedance flows for the sea lamprey and steelhead migration seasons, respectfully, using instantaneous flow data at USGS gage 04213000 for the period of record (1990-2022). Percent exceedance flows are listed in Table 2.

According to the USFWS (2017) "Fish Passage Engineering Design Criteria", the low design flow may be taken as the flow in the river that is exceeded 95% of the time during the migratory period. Subsequently, the high design flow may be taken as the flow that is exceeded 5% of the time. These flows were calculated for the migration season to help inform design of any fishway features included as part of the sea lamprey barrier design. The 95% and 5% exceedance flows during the steelhead migration season were calculated to be 8 cfs and 1340 cfs, respectively.

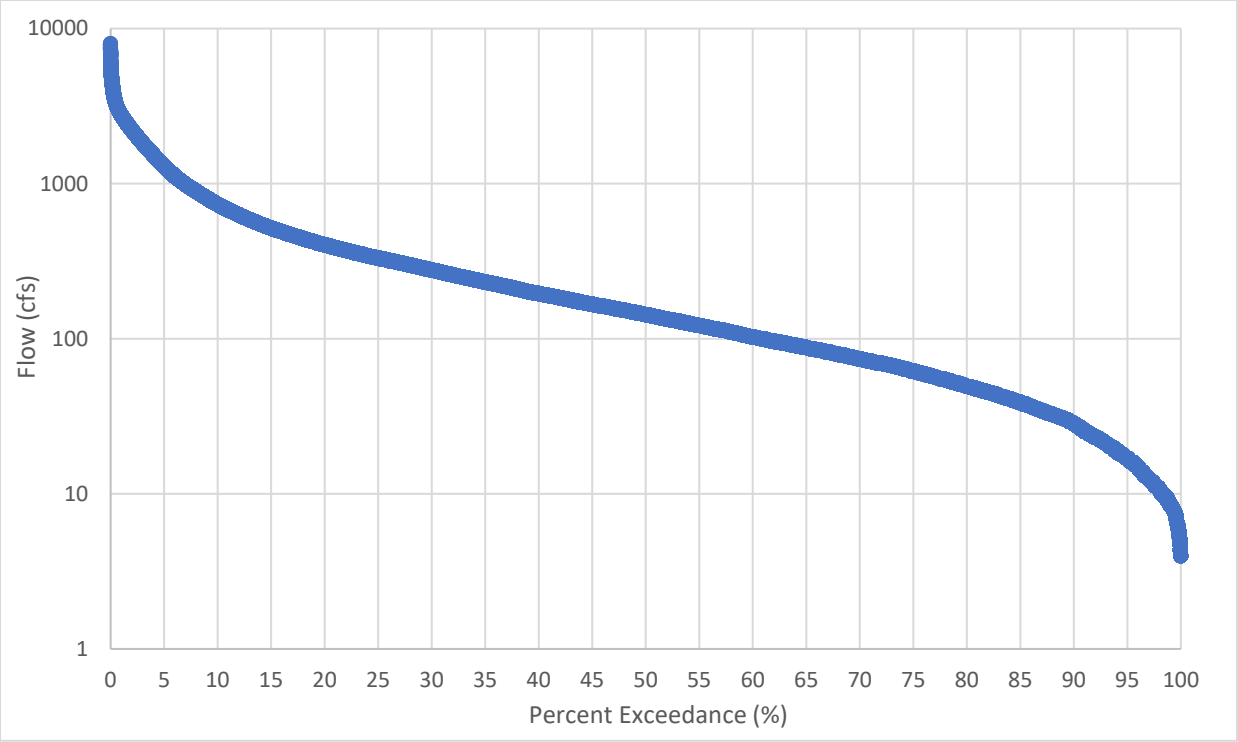


Figure 9. Semi-logarithmic Plot of Percent Exceedance Flows in Conneaut Creek During Sea Lamprey Migration Season.

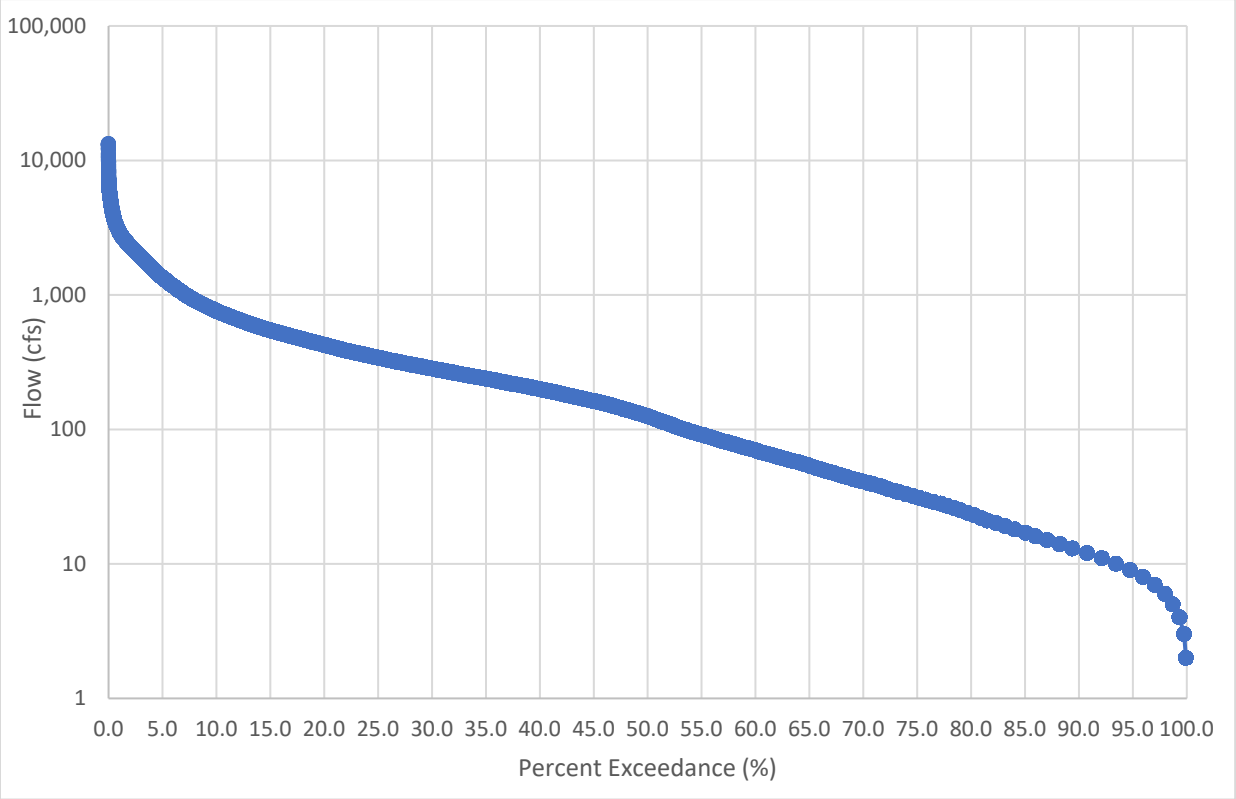


Figure 10. Semi-logarithmic Plot of Percent Exceedance Flows in Conneaut Creek During Steelhead Migration Season.

Table 2. Percent Exceedance Flows in Conneaut Creek from Instantaneous Flow Data at USGS Gage 04213000: Conneaut Creek at Conneaut OH, for Sea Lamprey and Steelhead Migration Seasons

Percent Exceedance (%)	Lamprey Migration Flow (cfs)	Steelhead Migration Flow (cfs)
1	2,760	2,930
2	2,210	2,310
3	1,820	1,910
5	1,290	1,340
10	734	759
15	515	545
20	402	425
25	330	340
30	277	282
40	195	199
50	142	125
60	102	69
70	74	40
75	62	31
80	49	23
85	39	17
90	28	12
95	17	8
97	13	7
98	11	5
99	9	4

3. Hydraulics

3.1 HEC-RAS Model Development

USACE Buffalo District developed a one-dimensional hydraulic model of Conneaut Creek using the USACE Hydrologic Engineering Center's River Analysis System (HEC-RAS). The model was developed using version 6.2 of the software. The model geometry was developed within RAS Mapper using built in GIS tools to delineate channel centerlines, bank stations, flow paths and cross sections. All elevations are referenced in the North American Vertical Datum of 1988 (NAVD88) and the projected coordinate system is NAD 1983 Pennsylvania State Plane North (FIPS code = 3701, units = feet).

The terrain data used to model the overbank flow, collected in 2019 by the United States Geological Survey (USGS), has a spatial resolution of 2.5 feet. Bathymetric survey data of Conneaut Creek was obtained by the USACE Buffalo District survey team in the summer of 2022. This was data comprised of 32 cross sections and 5 bridges within the study reach. Of the 5 bridges, 2 of them (Brown Road and McKee Road) were modeled as inline structures as the bridge decks are no longer existing and only the abutments remain. Figure 11 shows the 1D HEC-RAS model domain and terrain data.

The bathymetric data was incorporated at all surveyed cross sections to create a channel only surface for Conneaut Creek. This surface was incorporated into the LiDAR terrain data to create a final terrain for accurate mapping and modeling utilizing additional cross sections that were not surveyed. Cross section spacing was determined based on the channel slope to be approximately 1000 – 1500 ft per cross section. Due to lack of rights of entry to survey all required cross sections, several additional cross sections were required to achieve the appropriate spacing. The added cross sections incorporate the channel only surface created from the bathymetric surveyed cross sections, which is an interpolated surface between surveyed cross sections. Figure 12 shows a representative cross section of the Conneaut Creek channel and floodplain within the study reach.

The downstream boundary condition for the 1D model is the normal depth with a slope of 0.0016. This slope was taken from the modeled energy grade line slope at the downstream boundary. The location of the downstream boundary condition, along with the relatively steep slope of the channel upstream, provided sufficient distance from the study reaches such that they would not be impacted by any errors produced by this boundary condition. A sensitivity analysis on normal depth slope was performed to ensure the energy grade line slopes of the modeled flow profiles did not have a significant impact on WSE at the boundary and extending upstream. Additionally, modeled downstream boundary condition is not impacted from any backwater effects downstream. Both ACE flow frequencies in Table 1 and several percent exceedance flows listed in Table 2 were used for the steady flow data in the model. Flow change locations at PA Route 6N and the PA/OH state line were included.

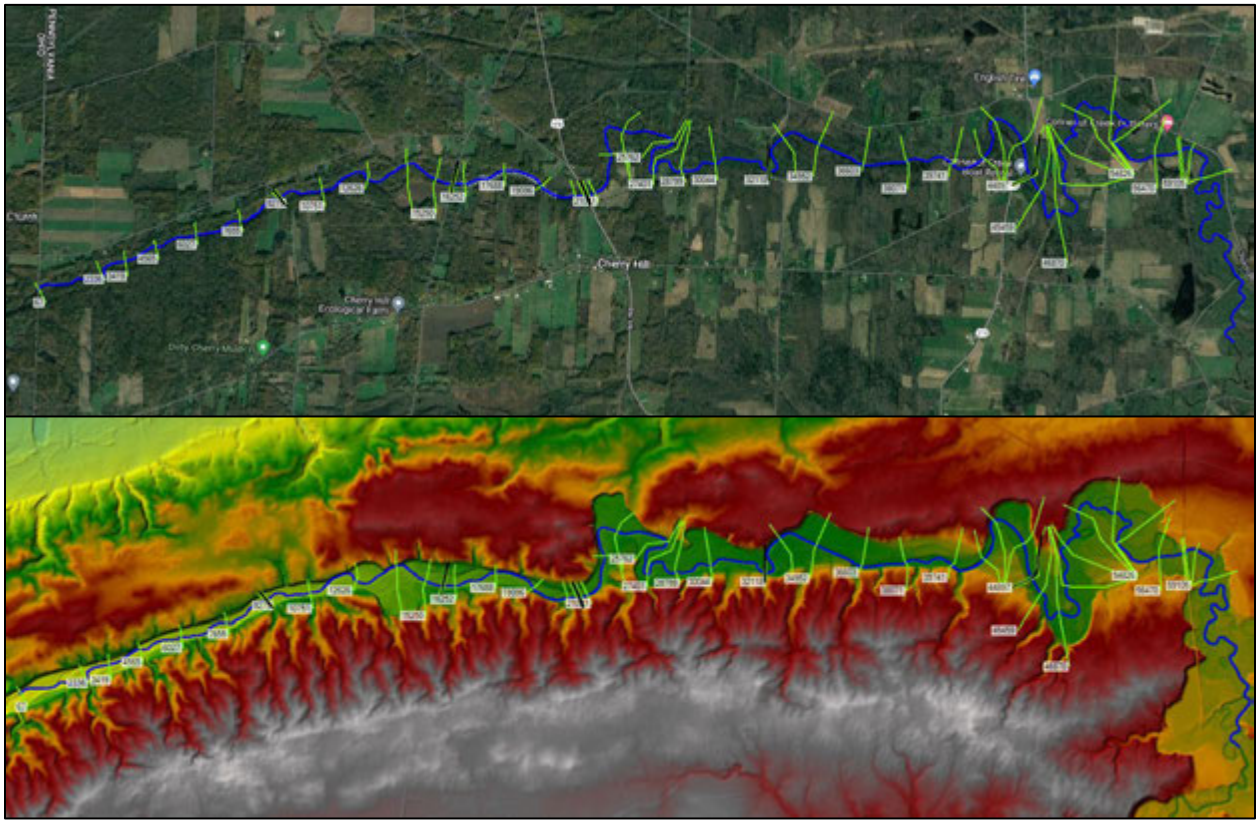


Figure 11. 1D HEC-RAS Model Domain and Terrain.

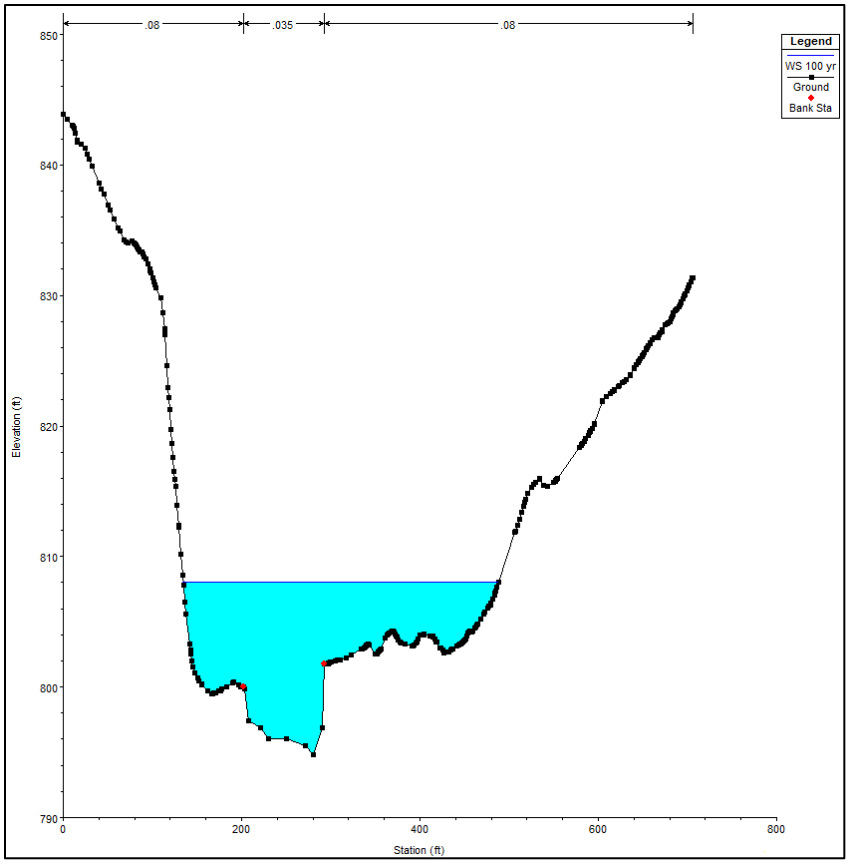


Figure 12. Typical Cross Section of Conneaut Creek Channel and Floodplain within the Study Reach with 1% ACE WSE.

3.2 Terrain

Terrain data from the United States Geological Survey (USGS) obtained from the Pennsylvania Geospatial Data Clearinghouse was used to create the terrain data in the HEC-RAS model. The data was collected between fall 2019 and spring 2020 using LiDAR, or Light Detection and Ranging, technology to get elevation points that were stored in 10,000 ft by 10,000 ft blocks. The raw LiDAR data was processed and filtered to remove LiDAR points on elevated features such as vegetation, buildings, cars, etc. in order to create a bare earth surface meeting the accuracies required for contour generation. These blocks of raster digital elevation models (DEMs) with horizontal ground resolution of 2.5 ft were mosaiced together to create a terrain for the study area.

3.3 Calibration

Channel and overbank Manning's 'n' values were estimated from in field observations along the study reach of Conneaut Creek. A channel Manning's 'n' value of 0.035 was chosen, representing a clean, straight channel with stones and shoals, consistent with what was observed along the study reach (Chow, 1959). Overbank Manning's 'n' values are 0.08, representing heavy stands of timber with few downed trees, little undergrowth, and branches above the flood stage. This land cover description matches up well with not only field observation, but also the NLCD land cover classifications mentioned above, with 48 percent of the floodplain classified as forested and 36 percent as wetland.

In FEMA FIS # 39007CV000B for Ashtabula County, Ohio a detailed study was performed on the lower reaches of Conneaut Creek (FEMA, 2019). Manning's 'n' values for this study range from 0.015 – 0.030 in the channel and 0.030 – 0.070 in the floodplain. These values provide some insight and justification for the Manning's 'n' values selected for the project reach. The portion of Conneaut Creek in the FIS study (Figure 7) is the most urbanized of the entire watershed (Figure 4). It would be expected that the floodplain is less densely forested, and the channel is less natural in the reach. Therefore, Manning's 'n' values for the project reach compared to the FIS reach would likely be higher.

No known studies or high-water mark data was found when researching Conneaut Creek hydrologic data. This data would provide observed data points to help with calibration of the HEC-RAS model. Efforts to obtain high water mark data are being coordinated with USACE and PAFBC by monitoring forecasted weather and flows within Conneaut Creek. In event of a significant flow event, water surface elevations could be estimated by measuring from several bridges along the project reach. Using a known elevation, like the bridge deck, the WSE at that point would be estimated. Areas of interest are the Griffey Road Bridge, the Route 6N Bridge, the McKee Road Bridge abutments, and the Summerville Road Bridge. This data will aid in calibration of the 1D HEC-RAS model.

In lieu of any calibration data at present, a sensitivity analysis was performed under different Manning's conditions. Manning's 'n' values were increased to the maximum reasonable values for overbanks (0.16 = heavy stand of timber, a few down trees, little undergrowth, with flood stage reaching the branches). The results showed variable increases in WSE spatially throughout the model, with the differences increasing as ACE flows increased. Some areas showed minor decreases as well. The increases in WSE with the higher Manning's 'n' value were greater than 1.0 ft in some areas for the 1% ACE flow. Figure 13 and Figure 14 show the 1% ACE and 0.2% ACE, respectively, inundation boundaries under recommended Manning's 'n' values compared to the increased maximum reasonable overbank values.

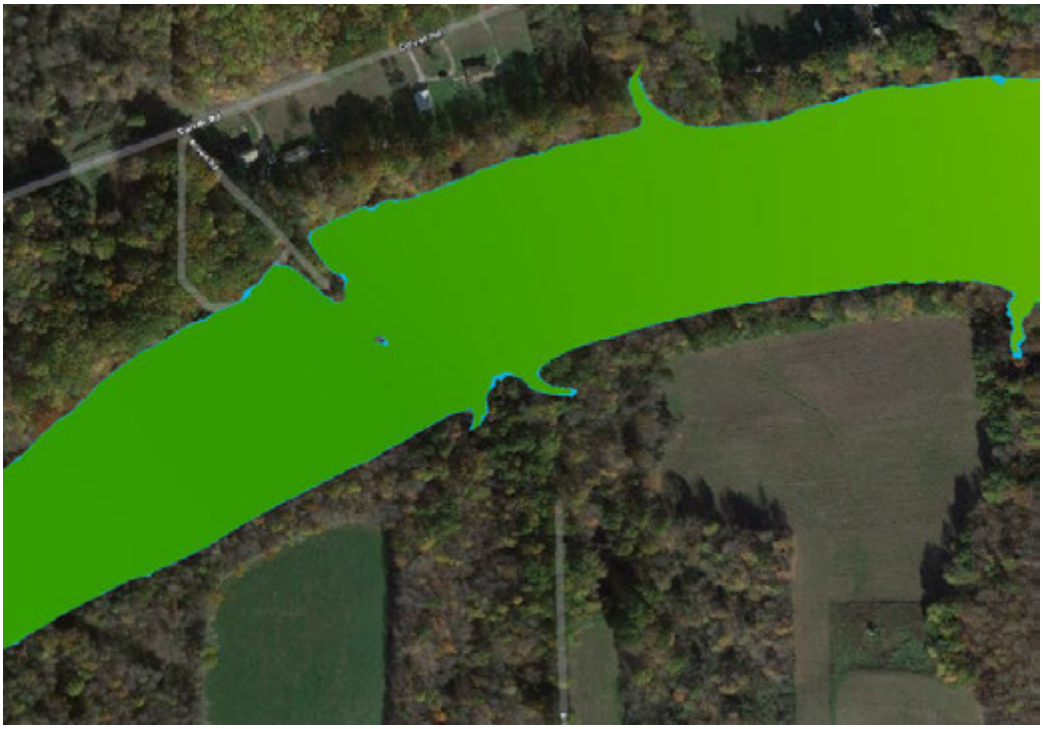


Figure 13. 1% ACE Inundation Boundaries for Recommended Manning's n Values (Green) to Max Manning's n Values (Blue)

Figure 14. 0.2% ACE Inundation Boundaries for Recommended Manning's n Values (Orange) to Maximum Manning's n Values (Blue)

However, due to the lack of better calibration data, the Manning's 'n' values were kept at the original values (0.035 channel, 0.08 overbanks) as we found these values more representative of actual conditions on the ground. Additionally, the changed Manning's 'n' value for existing conditions would also be applied to with barrier conditions, so we would expect increases due the project be similar regardless of which Manning's values were chosen. The impacts of the increased Manning's 'n' on inundation were also considered. While the higher values yielded greater WSE's, the impacts were minimal to inundation extent due to the topography in the floodplain and steep valley containing Conneaut Creek. Within the project reach, the increased Manning's 'n' values did not place any structures within the floodplain with a sea lamprey barrier in place. Table 3 shows a comparison of WSE at Brown Road and Griffey Road under the recommended overbank Manning's 'n' Scenario (n = 0.08) to the high calibration overbank manning's 'n' scenario (n = 0.16) for all modeled flow frequencies.

Table 3. Comparison of WSE at Brown Road and Griffey Road Under Recommended Overbank Manning's 'n' Scenario (n = 0.08) to High Calibration Overbank Manning's 'n' Scenario (n = 0.16) for All Modeled Flow Frequencies

		WSE (ft NAVD88)			
Flow Frequency	**Flow (cfs)**	**Brown Road n = 0.08**	**Brown Road n = 0.16**	**Griffey Road n = 0.08**	**Griffey Road n = 0.16**
95% Exceedance	7	777.85	777.85	790.12	790.12
25% Exceedance	330	779.68	779.68	792.40	792.40
10% Exceedance	735	780.88	780.88	793.48	793.48
5% Exceedance	1200	781.91	781.92	794.46	794.46
99% ACE	1375	782.25	782.26	794.72	794.72
2% Exceedance	1900	782.86	783.03	795.46	795.46
67% ACE	3816	785.04	785.38	797.33	797.34
50% ACE	4897	785.88	786.45	798.15	798.19
20% ACE	7230	787.57	788.39	799.31	799.51
10% ACE	8842	788.57	789.56	800.02	800.33
4% ACE	10909	789.69	790.88	800.78	801.24
2% ACE	12495	790.47	791.80	801.31	801.89
1% ACE	14069	791.17	792.66	801.80	802.48
0.2% ACE	17813	792.73	794.54	802.79	803.18

3.4 Existing Conditions

Using the model geometry and flow data described above, the existing conditions for Conneaut Creek were modeled. This data serves as a baseline for comparison to the sea lamprey barrier alternatives modeled. The impacts on WSE, inundation, channel velocity, etc. from the construction of the sea lamprey barrier relative to existing conditions within Conneaut Creek were analyzed below within this appendix. Additionally, since the floodplain is a FEMA Zone AE and no detailed study has been performed, the modeled 1% ACE floodplain is the effective existing conditions floodplain that will be used to determine FEMA flood insurance implications associated with construction of the project. Figure 15 and Figure 16 show the modeled existing conditions 1% ACE floodplain within the study reach. Table 4 shows the existing conditions WSE's within the model for all flows analyzed.

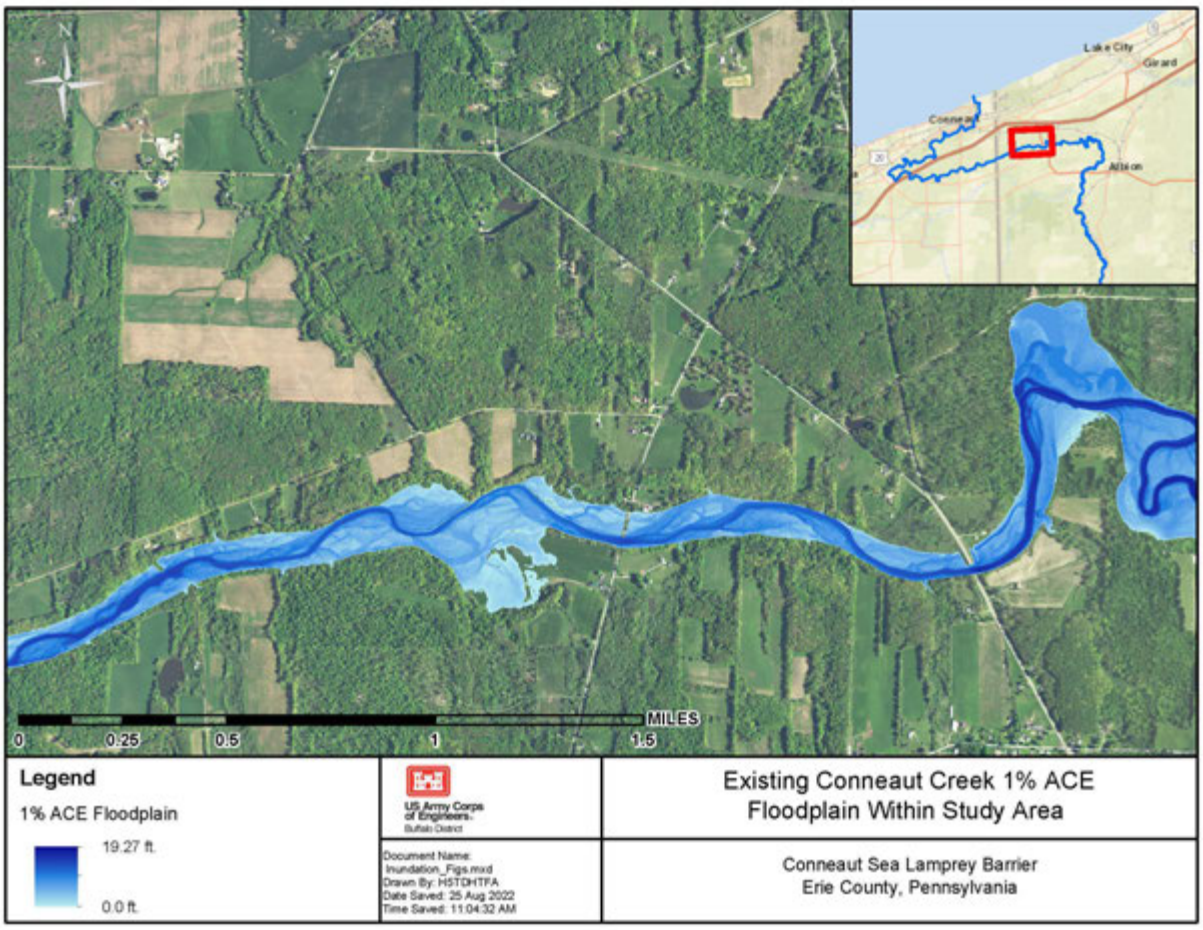


Figure 15. Existing Conditions 1% ACE Floodplain and Associated Depth of Flow Within Study Area

Table 4. Existing Conditions WSEs for All Evaluated Flows Within the Study Area

		WSE (ft NAVD88)			
Flow Frequency	**Flow (cfs)**	**DS Boundary**	**Brown Road**	**Griffey Road**	**Route 6N**
95% Exceedance	7	765.10	777.85	790.12	798.30
25% Exceedance	330	767.09	779.68	792.40	800.60
10% Exceedance	735	768.09	780.88	793.48	801.85
5% Exceedance	1200	768.99	781.91	794.46	802.91
99% ACE	1375	769.28	782.25	794.72	803.25
2% Exceedance	1900	770.17	782.86	795.46	804.14
67% ACE	3816	771.96	785.04	797.33	806.45
50% ACE	4897	772.70	785.88	798.15	807.41
20% ACE	7230	774.17	787.57	799.31	809.15
10% ACE	8842	775.01	788.57	800.02	810.21
4% ACE	10909	775.97	789.69	800.78	811.44
2% ACE	12495	776.83	790.47	801.31	812.32
1% ACE	14069	777.39	791.17	801.80	813.16
0.2% ACE	17813	778.59	792.73	802.79	815.06

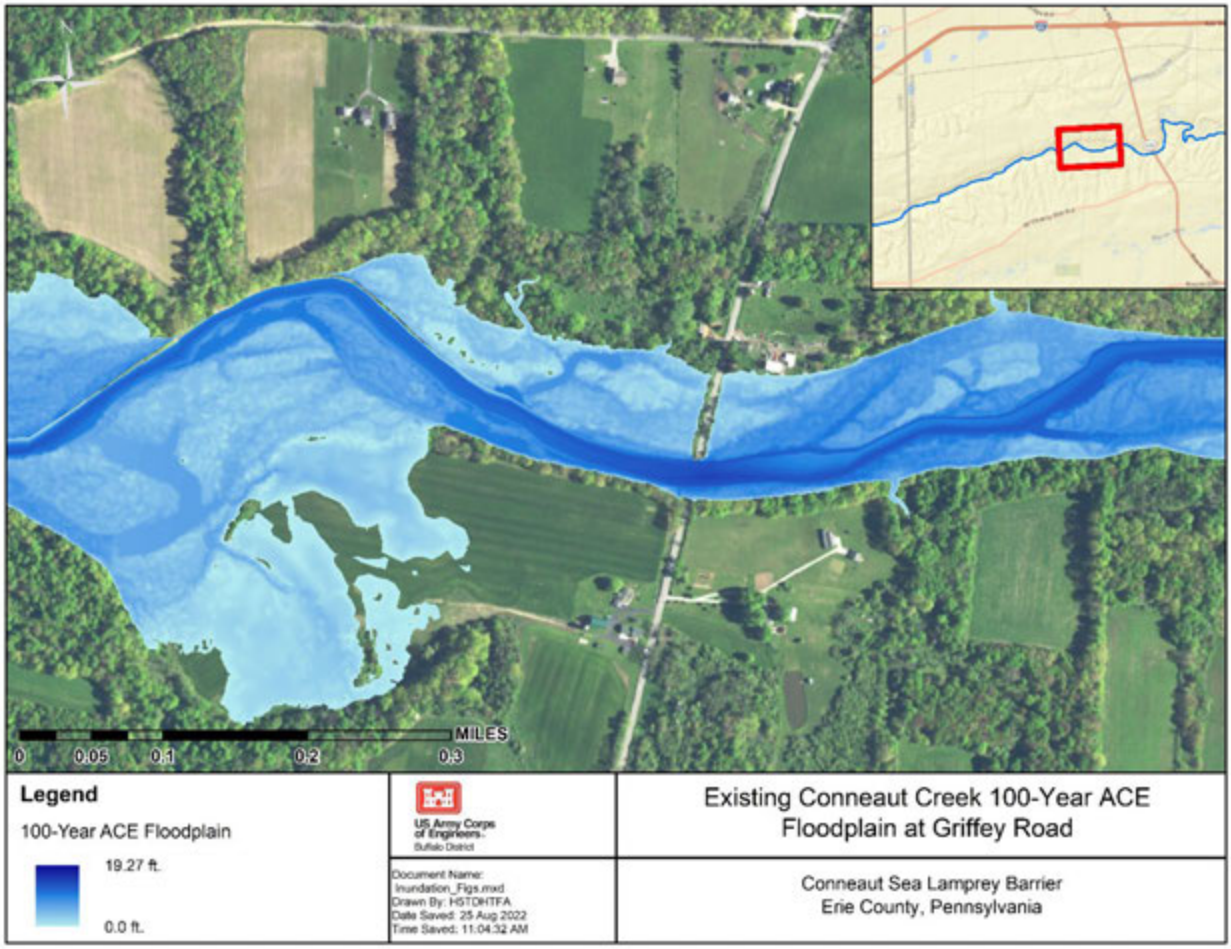


Figure 16. Existing Conditions 100% ACE Floodplain and Associated Depth of Flow at Griffey Road

4. Analysis of Alternatives

4.1 Barrier Location Criteria

The following criteria were used to evaluate the suitability of each potential barrier location:

- Length of creek protected – Conneaut Creek will still need chemical treatment for sea lamprey post barrier implementation. However, this treatment will occur downstream of the barrier. The further downstream the barrier is located, the less stream miles requiring chemical treatment and more stream miles upstream protected by the barrier. Therefore, site locations further downstream are preferred over sites upstream.

- Structure height required – the USFWS has provided a standard flood event, the 10-year frequency flood event (10% ACE event), that the lamprey barrier should be effective until. To achieve this level of protection, the barrier crest must be 18 inches above the 10% ACE tailwater elevation (Figure 17). The extra 18 inches provides additional separation from the headwater to ensure migration of sea lamprey is blocked at this flood frequency. As the structure height required to meet this 10% ACE plus 18 inch

required increases, the area inundated upstream of the dam at baseflow increases. The locations that minimize barrier height and therefore minimize the baseflow inundation are more preferrable for the barrier.

- Number of parcels impacted – Similar to the inundation, the number of parcels impacted by construction of a barrier at each site was considered. Barrier locations that impact less parcels, both at baseflow and during flood conditions, are preferred.

- Accessibility – The access to barrier locations is an important consideration for construction, real estate implications, operation and maintenance, etc. For these reasons, barrier locations were primarily identified at bridges and roadways. Preferred locations are easily accessible from public roadways and have the least amount of impacts to private property.

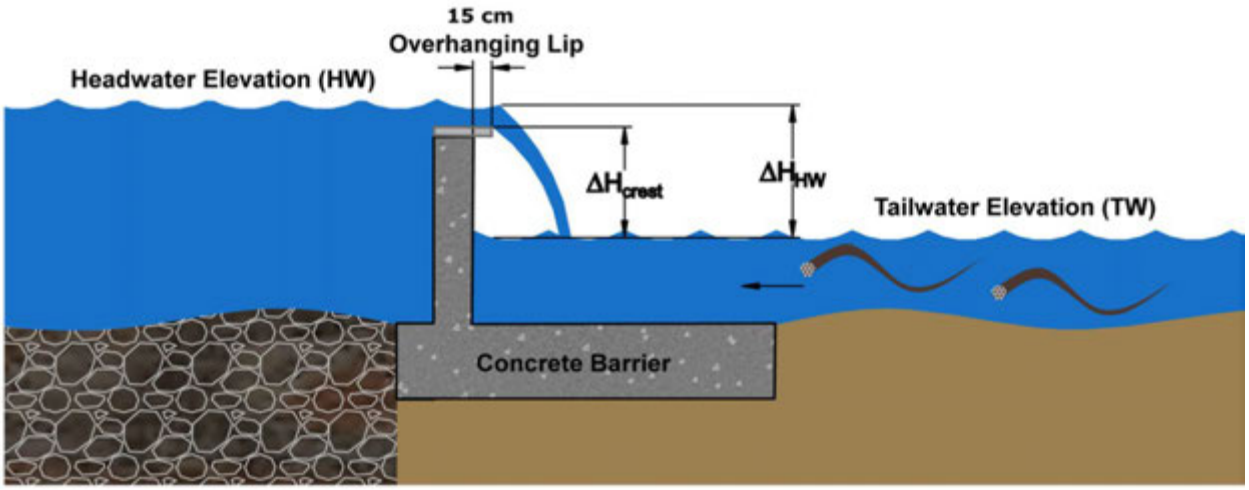


Figure 17. Diagram of typical fixed-crest sea lamprey barrier illustrating the difference between hydraulic head and vertical differential between barrier crest and tailwater elevation (ΔHcrest = 18 inches). Source: Zielinski et al, 2019

4.2 Site Selection

Initial investigations identified four potential locations for a sea lamprey control barrier within the Pennsylvania portion of Conneaut Creek. These sites were Brown Road, Griffey Road, Route 6N, and McKee Road (Figure 18). Sites further upstream were evaluated during the FID but determined to be infeasible based on required structure heights and the amount of inundation associated with the structure. The floodplain tends to be wider and the slope of the creek less steep in these upstream reaches, which caused more inundation associated with lamprey barriers.

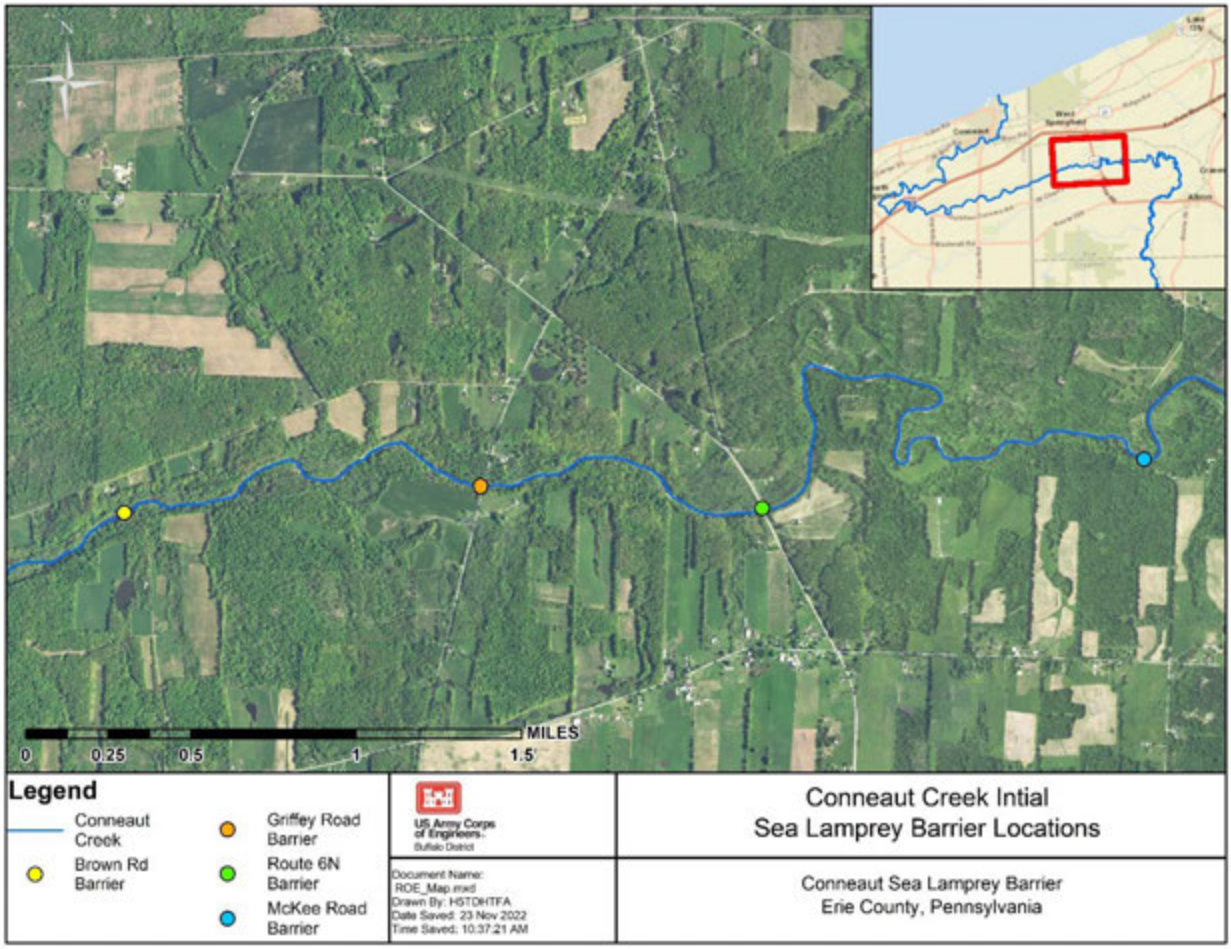


Figure 18. Conneaut Creek Preliminary Sea Lamprey Barrier Locations

The HEC RAS model of Conneaut Creek was used to narrow down the proposed barrier locations with the 10% ACE flow elevation modeled under existing conditions. The required 18 inches of separation was added to the modeled water surface elevation at each site location to determine an approximate barrier height. Using this barrier height elevation with terrain contour data in ArcGIS, the impacts of the structure at still water conditions, that is permanent inundation at baseflow, were analyzed based on the barrier criteria listed above.

After further evaluation two sites were determined to be most suitable for the structure: Brown and Griffey Road. Based on the required structure heights at McKee Road and Route 6N, the level of inundation and parcels impacted was determined to less suitable compared to the sites further downstream. The Brown Road and Griffey Road sites also protect more miles of stream from chemical treatment against sea lamprey.

4.2.1 Brown Road Site

Brown Road is an old road over Conneaut Creek approximately 1.75 river miles from the Pennsylvania/Ohio state line. The bridge no longer exists, but concrete abutments on left and right banks are still in place. A sea lamprey barrier at this location would benefit from using the existing abutments from the original bridge as its own, placing the barrier in between them (Figure 19). A barrier

at this location would be approximately 115 ft long. The LiDAR data indicates that the high ground on right of bank, presumably the old roadway embankment, is above the 5% ACE (20-year frequency) flood elevation and currently acts an encroachment within the floodplain. The left of bank however is much lower and would require fill up to the 10% ACE plus 18-inch elevation to create a suitable embankment for the barrier that also prevents upstream lamprey migration. The condition of the existing abutments and embankments needs to be determined and some improvements may need to be made to ensure they are structurally sound, but modeling indicates that they are currently loaded under high flow conditions. Additionally, this location is located the furthest downstream, providing more protection against sea lamprey than other sites on Conneaut Creek in Pennsylvania.

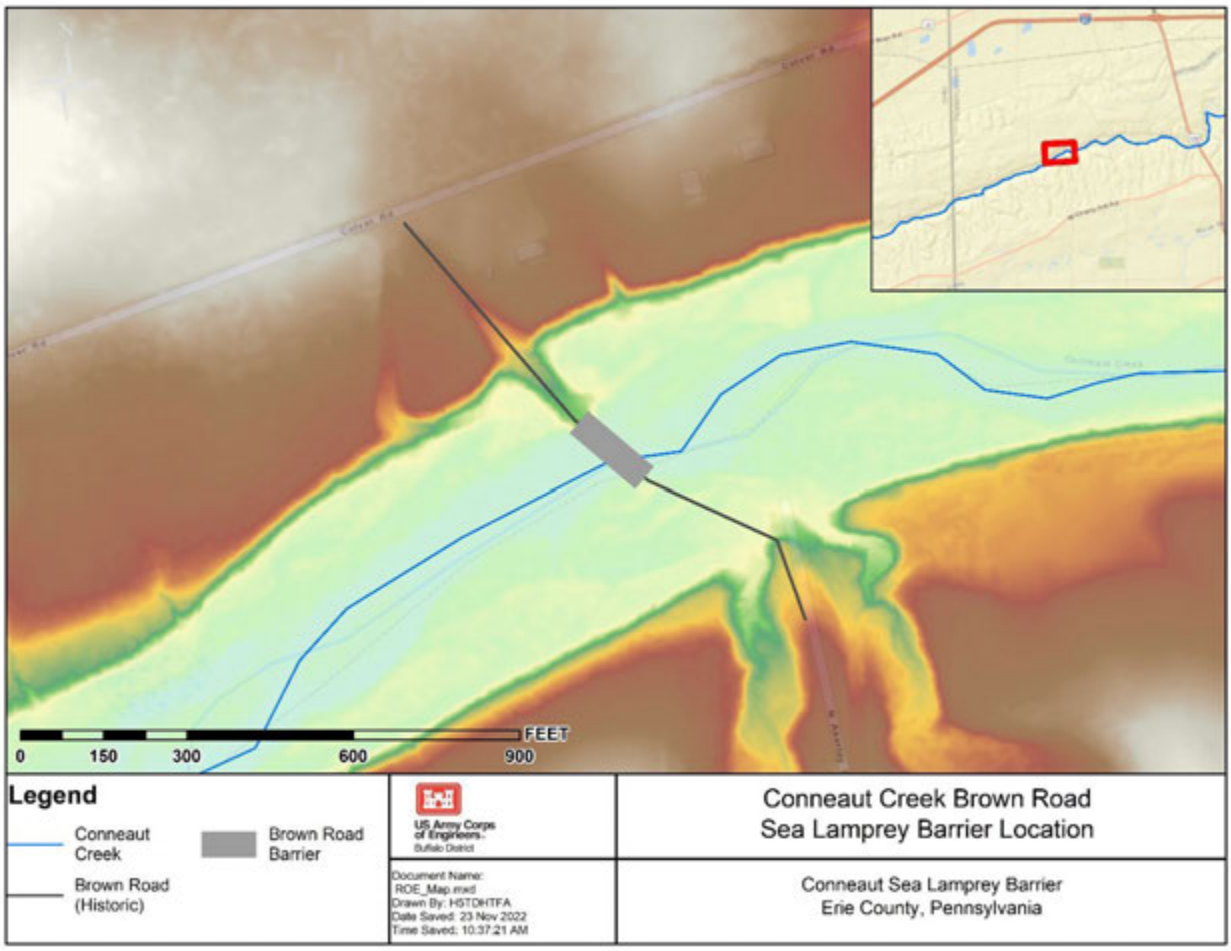


Figure 19. Brown Road Sea Lamprey Barrier Location

4.2.2 Griffey Road Site

The Griffey Road bridge is located roughly 1.25 river miles upstream from the Brown Road site. A sea lamprey barrier at this site would be placed just downstream of the bridge as shown in Figure 20. A barrier at this location would be approximately 110 ft long. The barrier would utilize the existing bridge abutment on the right of bank and tie into a steep, exposed shale wall on the left of bank. Placing the barrier here helps minimize impacts to the WSE due to the significant encroachment to the floodplain already created by the Griffey Road bridge. The roadway embankment is already loaded during out of bank flow events but may need additional protection for seepage or permanent loading at toe of

embankment due to a sea lamprey barrier. The parcel downstream of Griffey Road on the right of bank is owned by a project partner (PFBC), therefore additional access and real estate benefits may exist at this site.

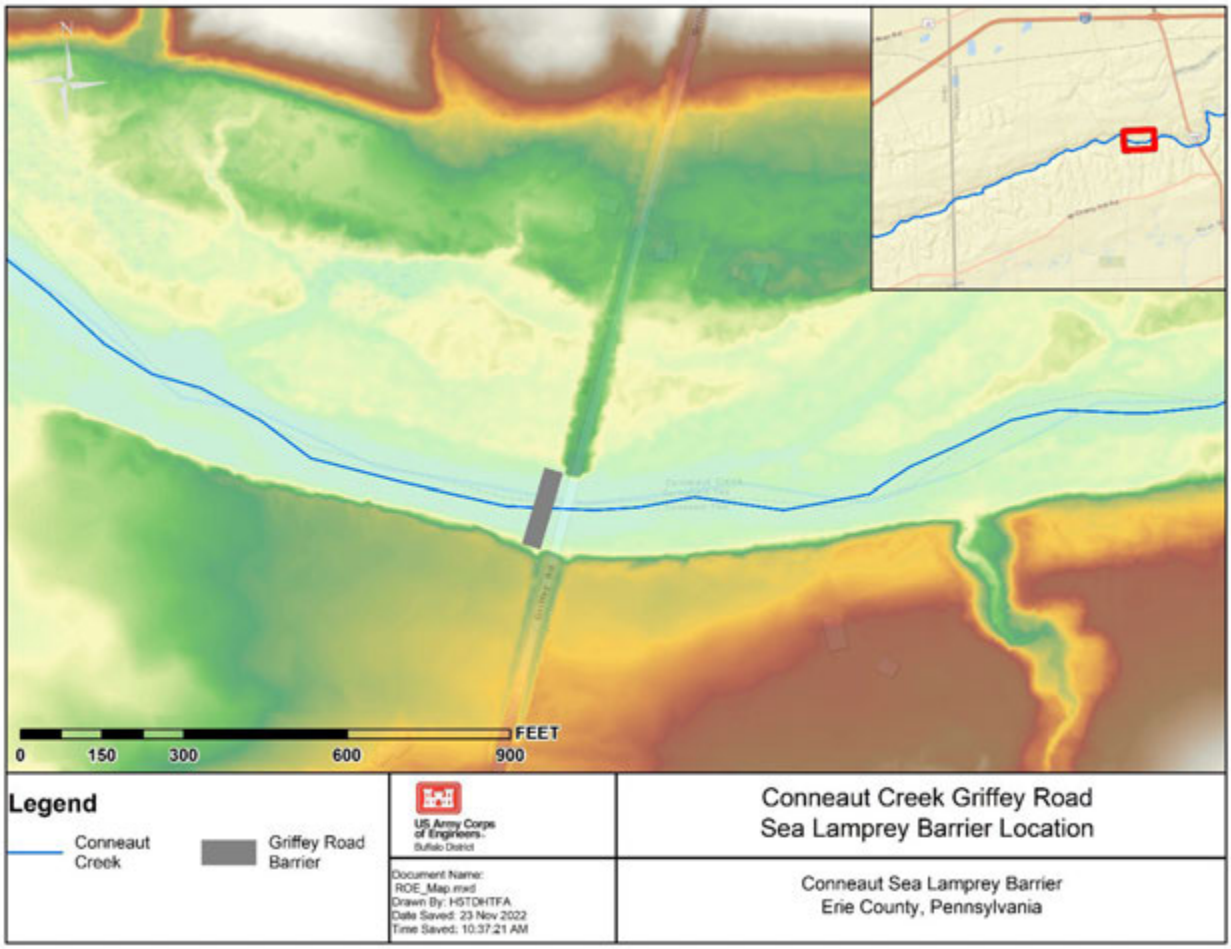


Figure 20. Griffey Road Sea Lamprey Barrier Location

4.3 Sea Lamprey Barrier Alternatives

A focused array of alternatives was developed that identified 5 primary barrier types: high-fixed crest, electrical only, low-fixed crest, Obermeyer adjustable low crest, and Inflatable adjustable low crest. The high-fixed crest barrier alternative (10% ACE plus 18-inch crest elevation) was screened out due to the unacceptable amount of inundation (at baseflow and flood flows) that barriers at this height would create. The 10% ACE plus 18-inch crest translates to barrier heights greater than 12 feet, which would result in tens of acres (40 plus depending on barrier location) of inundation permanent inundation from the impoundment created. The inflatable adjustable low crest barrier was also screened out due to operability and effectiveness concerns from the project sponsor. The remaining 3 alternatives, low-fixed crest barrier, electrical only barrier, and Obermeyer adjustable low crest barrier were evaluated using HEC-RAS modeling.

4.3.1 Low Fixed-Crest Barrier

The low fixed-crest barrier alternative utilizes the weir crest as the primary barrier for sea lamprey migration. Any sea lamprey that reaches the barrier is blocked from migrating upstream. The addition of lip overhanging horizontally from the dam crest prevents lamprey from suctioning to the dam face to migrate over the crest, which has been observed (Zielinski et al, 2019). The "low" designation is based on the crest height being less than the 10% ACE plus 18-inch elevation (which is the high fixed crest alternative). Low fixed-crest barrier alternatives were modeled in HEC-RAS using many flow frequencies below the 10% ACE for the crest elevation: the 25%, 10%, 5% and 2% exceedance flows during sea lamprey migration season plus 18 inches, and the 99% (1-year), 67% (1.5-year), and 50% (2-year) ACE plus 18 inches.

Since these barriers are designed to a higher flow frequency (lower flow) than the USFWS 10% ACE plus 18-inch requirement, a secondary barrier measure is required to prevent lamprey from migrating from the design frequency up until the 10% ACE frequency. The low fixed-crest barrier utilizes an electrical barrier installed laterally on the weir crest. Once flows exceed the design frequency and the 18 inches of separation between the tailwater and the crest is lost, the electrical barrier is activated, electrifying the water column, and preventing sea lamprey (and other fish species) from migrating upstream over the weir. Figure 21 shows the plan and profile views of a low fixed-crest barrier in Conneaut Creek.

Table 5. Modeled Low Fixed-Crest Barrier Alternatives and Associated Crest Elevations

Location	Barrier Frequency	Q	Crest Elevation
Brown Road	25% Exceedance + 18"	330	781.50
	10% Exceedance + 18"	735	782.50
	5% Exceedance + 18"	1200	783.50
	99% ACE + 18"	1375	783.75
	2% Exceedance + 18"	1900	784.25
	67% ACE + 18"	3816	786.5
	50% ACE + 18"	4897	787.5
Griffey road	25% Exceedance + 18"	330	794.00
	10% Exceedance + 18"	735	795.00
	5% Exceedance + 18"	1200	796.00
	99% ACE + 18"	1375	796.25
	2% Exceedance + 18"	1900	797.00
	67% ACE + 18"	3816	798.75
	50% ACE + 18"	4897	799.75

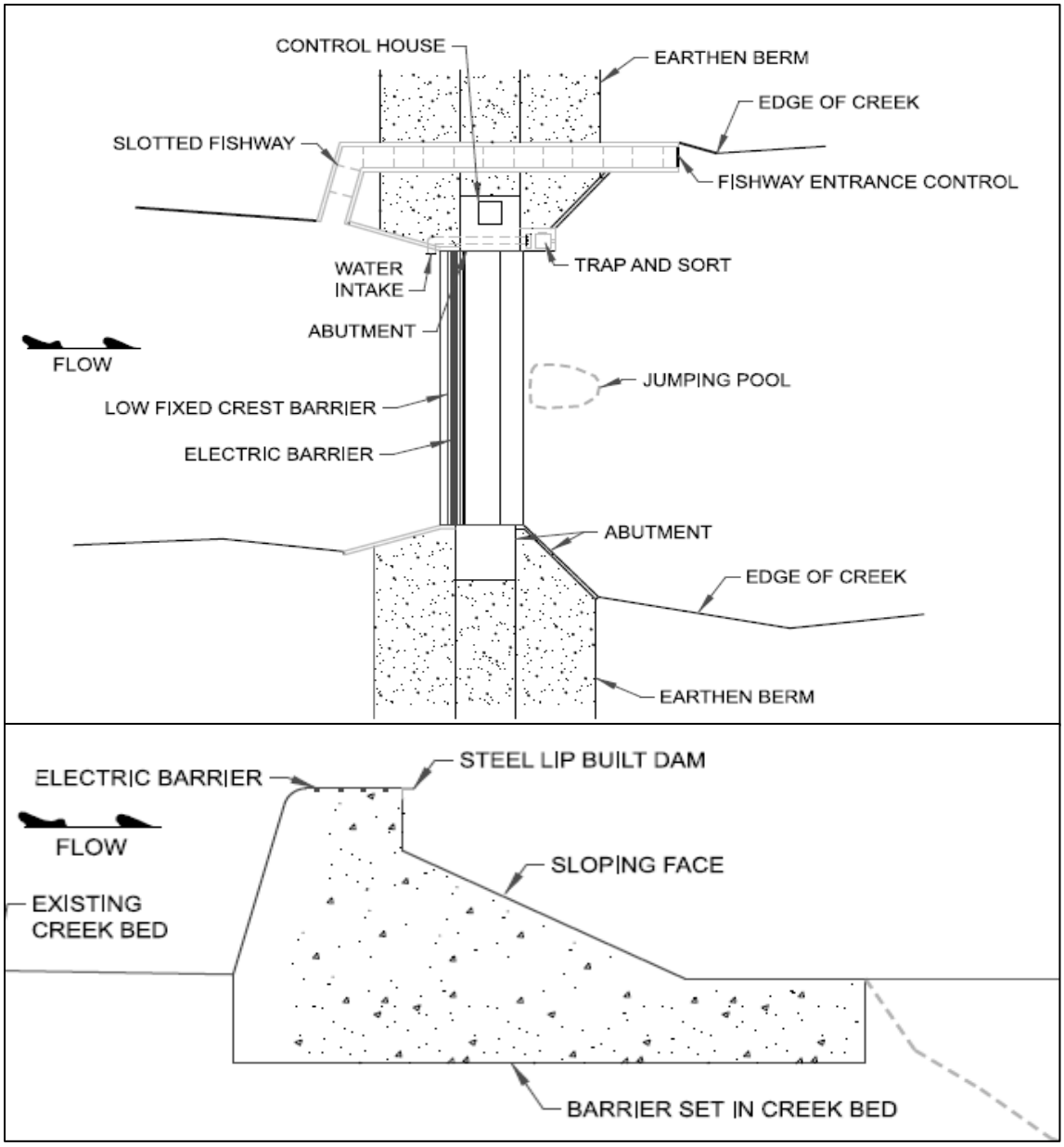


Figure 21. Plan view and profile view of a low-fixed crest/electrical sea lamprey barrier design in Conneaut Creek.

4.3.2 Obermeyer Adjustable Low Crest Barrier

The Obermeyer adjustable low crest barrier operates similar to the low-fixed crest barrier, except the crest height is able to adjust to different flow conditions or adjust seasonally. Outside of lamprey migration season, the Obermeyer barrier is uninflated allowing Conneaut Creek to flow freely with no impoundment. During lamprey migration season, the barrier can be operated in two different fashions. First, the crest can be raised or lowered with the creek stage to maintain 18 inches of separation with the tailwater. Once the Obermeyer is fully inflated or raised and the 18 inches of separation is lost, the electric barrier is activated, and the Obermeyer can lower to the uninflated position. This reduces water surface elevation impacts at flows exceeding the barrier design frequency. Second, the Obermeyer can be raised and physically braced at the 25% exceedance plus 18” elevation for the entire migration

season, regardless of the tailwater elevation. Similar to the first method of operation, once the 18" of separation is lost, the electrical barrier comes on, but the barrier remains up in the fixed position. This provides additional protection against lamprey migration and reduces concerns associated with failure of the Obermeyer's pneumatic systems. The electrical barrier is placed at the base of the barrier, rather than on top like the low-fixed crest barrier. Figure 22 shows a profile and plan view of the Obermeyer adjustable low crest structure.

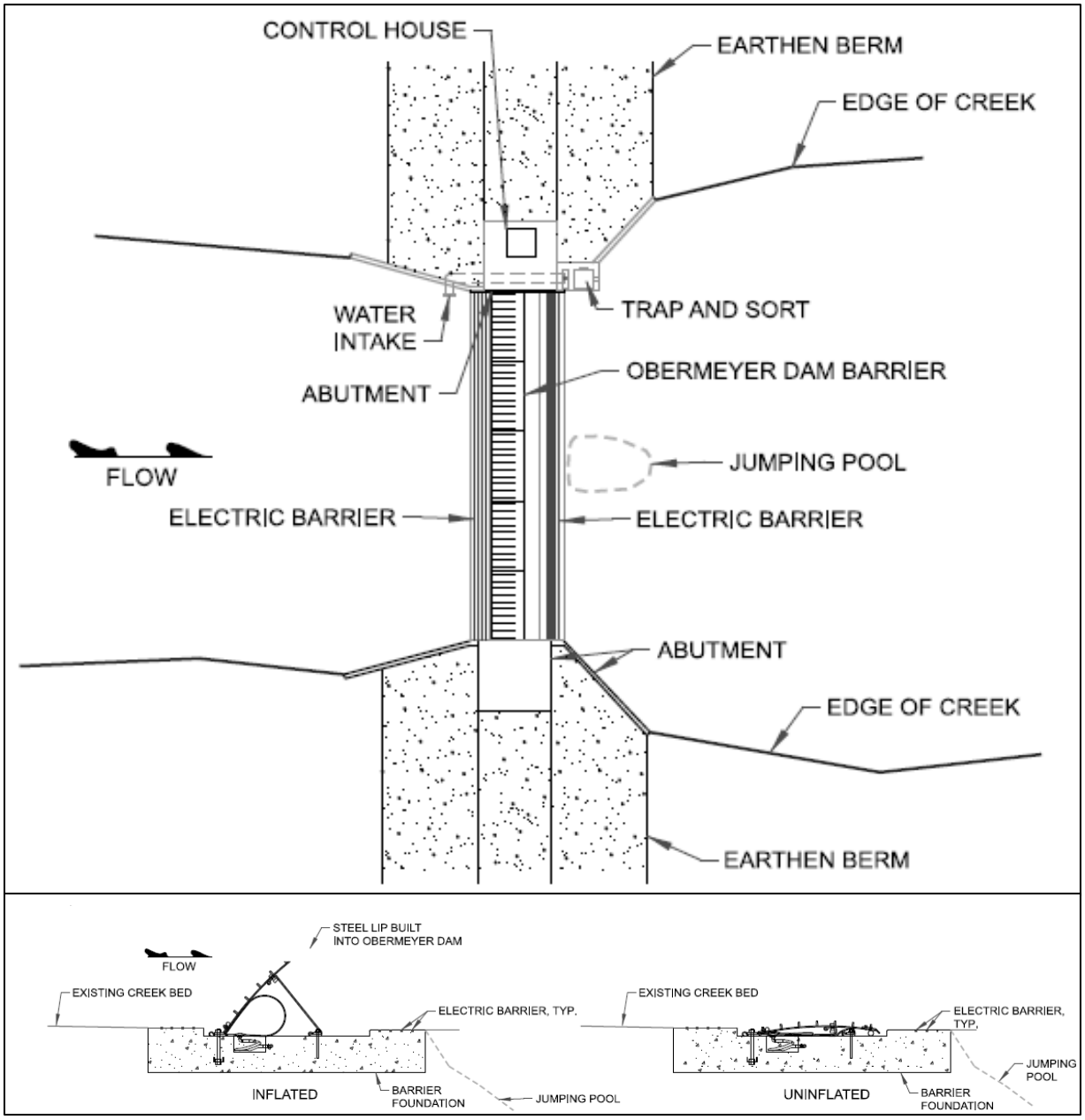


Figure 22. Plan view and profile view of an Obermeyer adjustable low crest sea lamprey barrier design in Conneaut Creek.

Since the fully raised Obermeyer has a top elevation the same as the low fixed-crest barrier, the HEC-RAS modeling of the alternatives is the same and the low fixed-crest results can be applied to both. If the crest of the Obermeyer is lowered at high flows, the flood impacts associated with this alternative

can be considered the same as the electrical only alternative. However, flood impacts were determined considering the barrier stays raised for all flow frequencies beyond the 25% exceedance when the electrical barrier activates (see Flood Impact Assessment), which is the more conservative approach in determining project impacts.

4.3.3 Electrical Only Barrier

The electrical barrier operates with no crest and will have little to no impacts to WSE upstream at all flows. A flat concrete sill across channel invert is constructed with the electrical barrier installed along the top. As the primary barrier, the electricity is required to be activated at all times throughout the sea lamprey migration season, as opposed to the other two alternatives where the electrical barrier is only activated as a secondary measure once 18 inches of separation between the tailwater and crest is lost. The electric only barriers at Brown and Griffey Road were modeled in HEC-RAS as a flat sill across Conneaut Creek slightly above the channel invert elevation to evaluate impacts. Figure 23 shows a plan view and profile view of the electrical only barrier alternative.

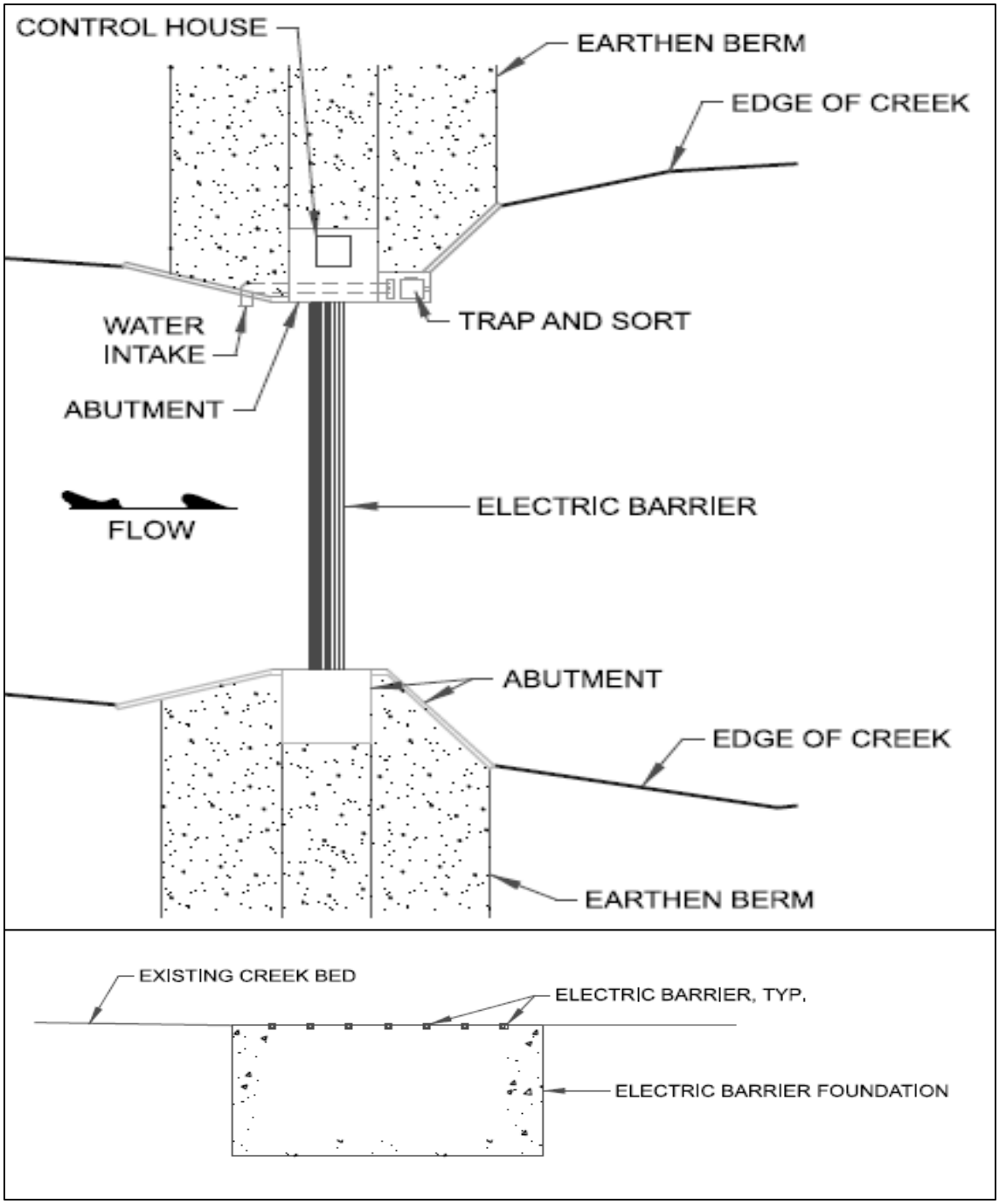


Figure 23. Plan view and profile view of an electrical only sea lamprey barrier design in Conneaut Creek.

4.4 Fish Passage Alternatives

Fish passage is a critical feature of each barrier considered in Conneaut Creek. Most notably, Conneaut Creek is home to a large Steelhead Trout run from Lake Erie extending upstream of the potential barrier locations. Fish passage must be implemented for the project to ensure Steelhead and other native fish species are able to move upstream past the sea lamprey barrier. The primary method of passage will be trap and sort. This allows for both fish and sea lamprey to enter the trap, where the lamprey are

removed, and native fish allowed to continue upstream. Removing the lamprey not only prevents them from accessing spawning territory upstream of the barrier, but also stops them from potentially finding spawning success downstream as well. The trap requires manual sorting by personnel during the lamprey spawning run (March – June). The trap can be located at the upstream end of a fishway, or downstream of the barrier requiring manual transport of fish upstream. Outside this season, the trap can be removed or blocked so no sorting is required, and fish are free to move upstream.

In order for fish to move upstream past a fixed barrier, a fishway will likely be required in conjunction with a trap and sort design. Potential fishway types utilized on Conneaut creek include vertical slot, Denil, and nature-like bypass fishways. A Denil fishway design uses angled baffles within a steep sloped ramp (Figure 24). The baffles dissipate the kinetic energy of flow and allow fish to move upstream through the Denil. These fishway types are usually used for steep slopes and therefore require less length and a smaller footprint. Vertical slot fishways utilize a series of pools with slotted entrances to each pool that extend to the bottom of the fishway channel (Figure 24). This accommodates a variety of fish and other aquatic species to move upstream through the slots and rest in the pools. Nature-like bypass fishways are a constructed channel designed to mimic a typical instream habitat and channel characteristics (Figure 25). The sloped channel design utilizes stepped pools created by weirs or boulders to allow fish to move upstream. These fishways require shallower slopes and therefore require more length and a larger footprint.

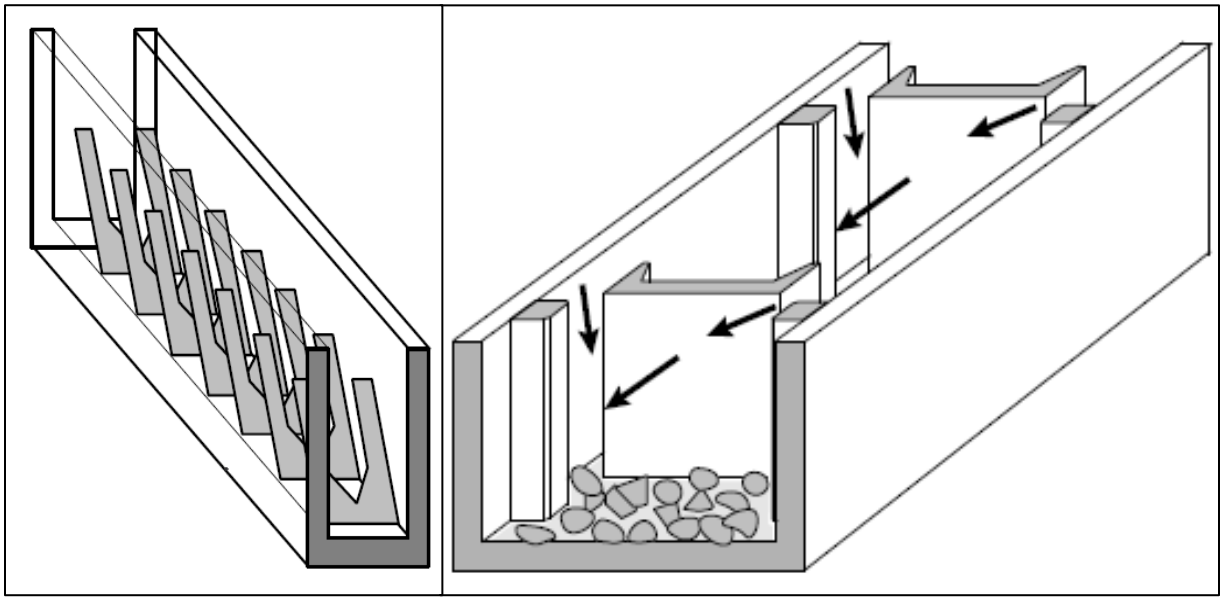


Figure 24. Illustration of a Denil Type Fishway (Left) and a Vertical Slot Type Fishway (Right). Source: FOA & DVWK, 1996

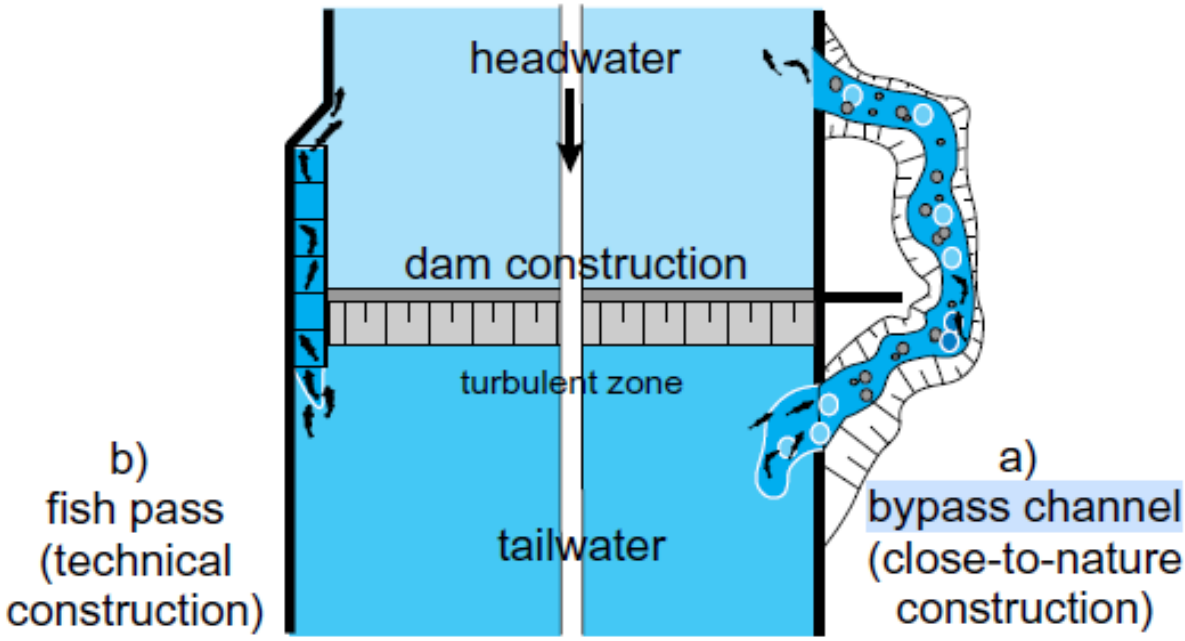


Figure 25. Illustration of a Technical Fishway (Denil, Vertical Slot) vs. a Nature-Like Bypass Fishway. Source: FOA & DVWK, 1996

The selected fish passage design is discussed in more detail in the Tentatively Selected Plan section of this appendix. The fishway design and trap and sort facility will be extensively analyzed during the design phase of the project to ensure fish passage over the sea lamprey barrier. Fishway design criteria include energy dissipation factor, velocity, slope, operation flows, etc., which will all be calculated and factored into the design.

4.5 Results

At both barrier locations, 7 barrier elevations were modeled for the low fixed crest/Obermeyer adjustable low crest barriers: the 2, 5, 10, 25 percent exceedance plus 18-inch barrier elevations and the 99% (1-year), 67% (1.5-year), and 50% (2-year) ACE plus 18 inches barrier elevations. These barriers were added to the HEC-RAS model as inline structures. As mentioned above, the Brown Road site required modifying the left overbank terrain to the 1% plus 18-inch elevation. This was added as part of the inline structure weir/embankment. The electric only barrier was also modeled at both Griffey and Brown Road sites. A low height inline structure was added across the channel invert to represent the sill structure for the electrical barrier.

For each of these 8 barriers, a range of flows from the 95% to 2 percent exceedance flows and the 99% to the 0.2% ACE flows was modeled. The 95% exceedance flow of 7 cfs was considered baseflow conditions in Conneaut Creek. All 8 barrier elevations at each site were compared to existing conditions at each site for all modeled flows.

Additionally, each parcel impacted at the Griffey Road and Brown Road sites was analyzed to determine the increases in inundation (acres) and WSE (ft) and percent increases in inundation area from implementation of the different barriers modeled. This information (not presented in this report) was

shared with landowners during the feasibility study. A final analysis of impacts to landowners was performed for the Tentatively Selected Plan (see below within Flood Impact Assessment).

Fish passage alternatives were not incorporated in the HEC-RAS modeling results during this phase of the study. The fishway alternative, design, and spatial extents are largely unknown, but will be extensively determined during the design phase of the study. Incorporating the fishway into the modeling could have an impact on the modeling and result in larger increases in WSE. However, the fish passage alternatives will be designed to limit upstream impacts as much as possible.

4.5.1 Low Fixed-Crest/Obermeyer Adjustable Low Crest Barrier

To analyze each site against the barrier criteria, 3 barrier design scenarios were chosen: the 67% (1.5-year) ACE plus 18 inches (High Scenario), the 5% exceedance plus 18 inches (Medium Scenario), and the 25% exceedance plus 18 inches (Low Scenario). Table 6 summarizes the barrier heights and inundation impacts at baseflow (95% exceedance flow) conditions for both the Griffey Road and Brown Road sites for the 3 barrier design scenarios. The flow depths at existing conditions compared to the with barrier scenarios were used to determine baseflow increases associated with the barrier immediately upstream of the structure. Baseflow increases from existing conditions are largest immediately upstream of the barrier and decrease upstream as distance from the barrier increases. Inundation acres, river miles, and parcels were determined using ArcGIS to analyze computed HEC-RAS inundation boundaries.

For the Low Fixed-Crest Barrier Alternative, baseflow WSE and inundation impacts are considered permeant impacts at each site. While the Obermeyer gates are operated seasonally, the impacts are also considered permanent as they affect upstream properties for an extended portion of the year (5 months).

Table 6. Griffey and Brown Road Low Fixed-Crest/Obermeyer Adjustable Low Crest Barrier Design Scenario Impacts at Baseflow (95% Exceedance Flow)

Design Scenario	Site	Barrier Height (ft)	Baseflow Increase (ft)	Inundation (acres)	Inundation (river miles)	Inundation (# parcels)
High (67% ACE + 18")	Brown Road	9.5	8.72	18.64	1.06	11
	Griffey Road	9.7	8.7	22.48	1.01	16
Medium (5% Exceedance + 18")	Brown Road	6.5	5.73	9.62	1.06	11
	Griffey Road	7.0	5.96	10.78	0.81	12
Low (25% Exceedance + 18")	Brown Road	4.5	3.73	5.23	1.06	11
	Griffey Road	5.0	3.97	3.2	0.37	7

4.5.1.1 Brown Road

Figure 26 - Figure 28 show the associated (permanent) baseflow inundation for the Brown Road site for each barrier design scenario, and Figure 29 shows a comparison of all 3 scenarios. Figure 30 and Figure 31 show the impacts associated with the medium design scenario (5% exceedance plus 18 inches) at the 50% and 1% ACE flows compared to existing conditions, respectively. Table 7. shows all modeled low fix-crest/Obermeyer adjustable low crest barriers impacts at the Brown Road site. Figure 32 shows the WSE at all modeled low fix-crest/Obermeyer adjustable low crest barriers at Brown Road.

The flow depths at existing conditions compared to the with barrier scenarios were used to determine baseflow increases associated with the barrier immediately upstream of the structure. Baseflow increases from existing conditions are largest immediately upstream of the barrier and decrease upstream as distance from the barrier increases. Inundation acres, river miles, and parcels were determined using ArcGIS to analyze computed HEC-RAS inundation boundaries.

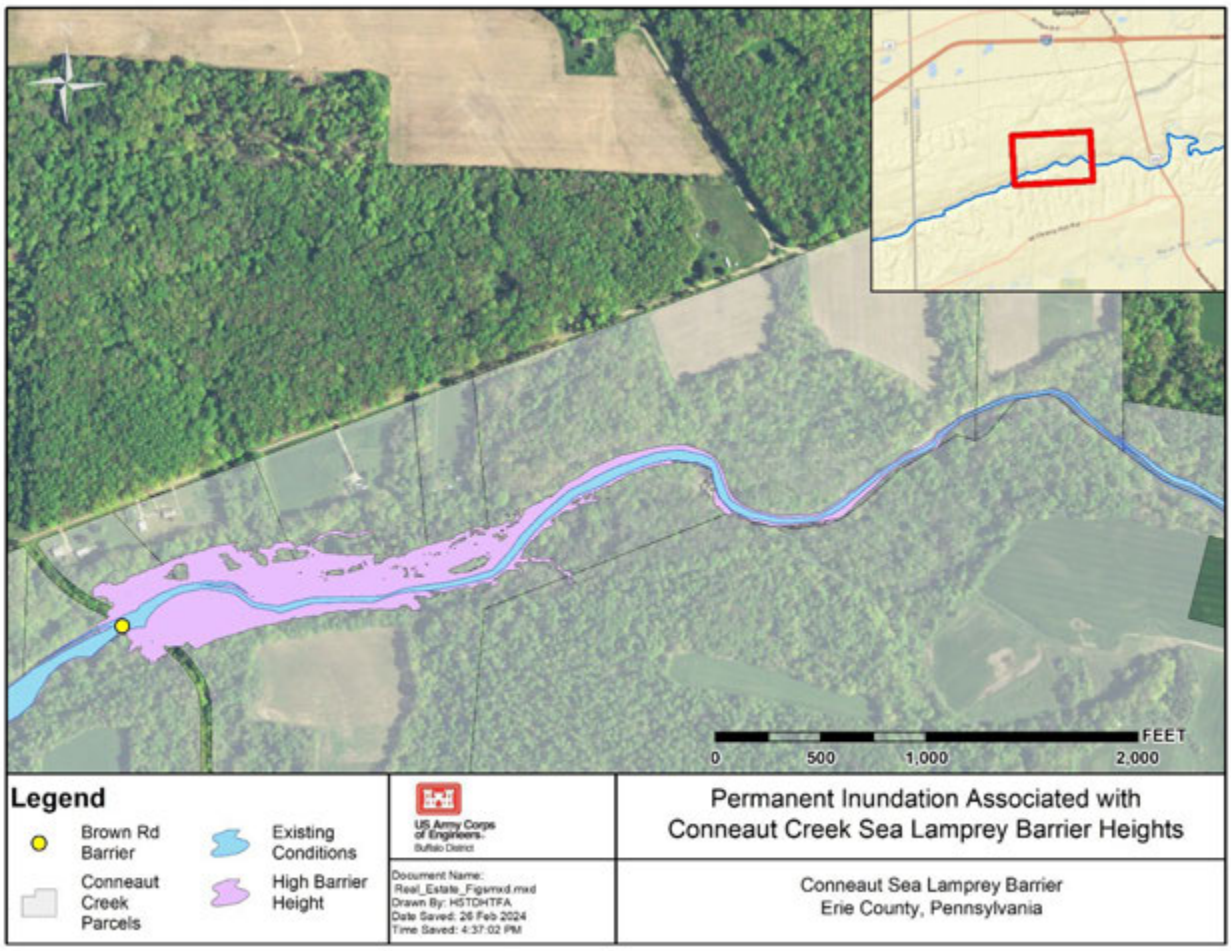


Figure 26. Permanent (Baseflow) Inundation for Brown Road Barrier – High Barrier Design Scenario Compared to Existing Baseflow Conditions

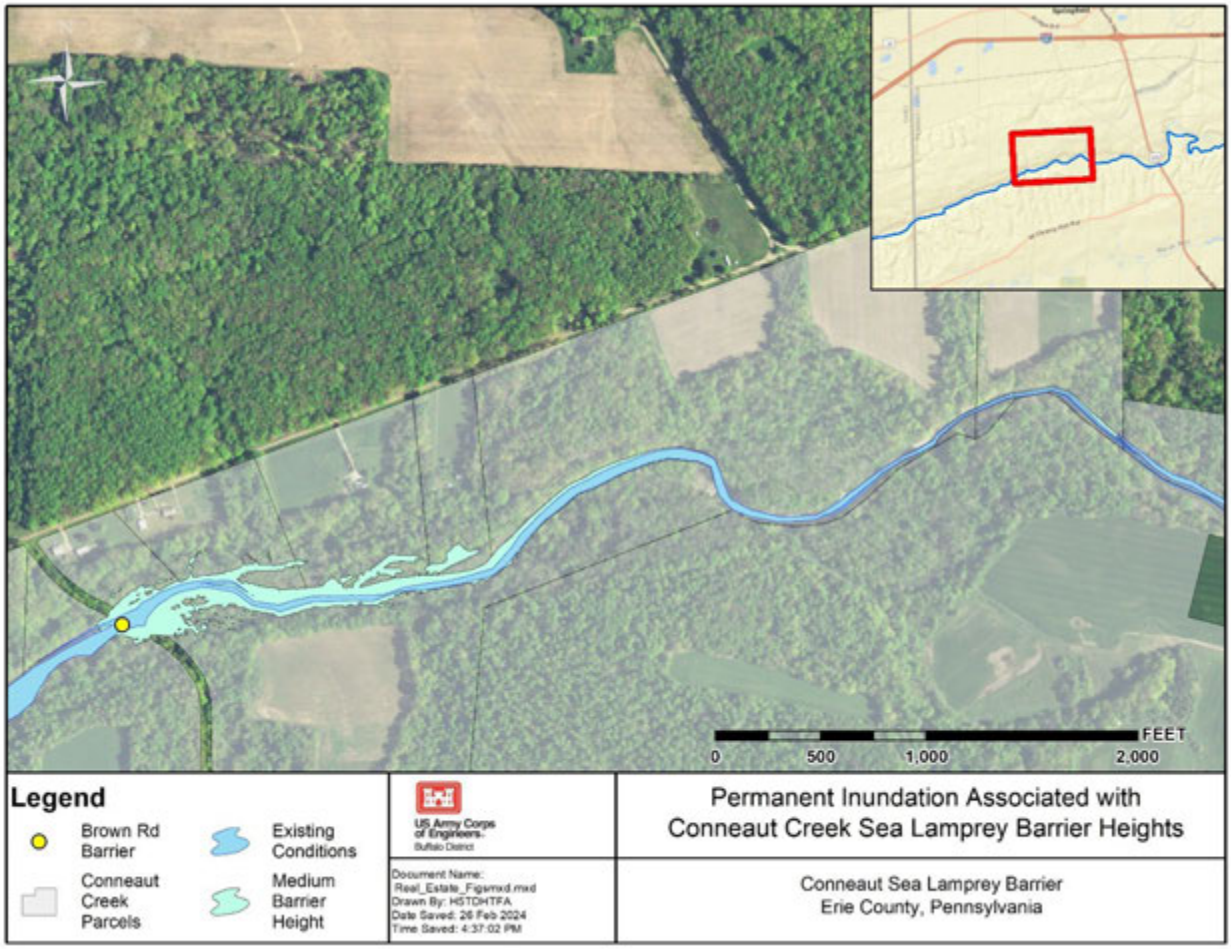


Figure 27. Permanent (Baseflow) Inundation for Brown Road Barrier – Medium Barrier Design Scenario Compared to Existing Baseflow Conditions

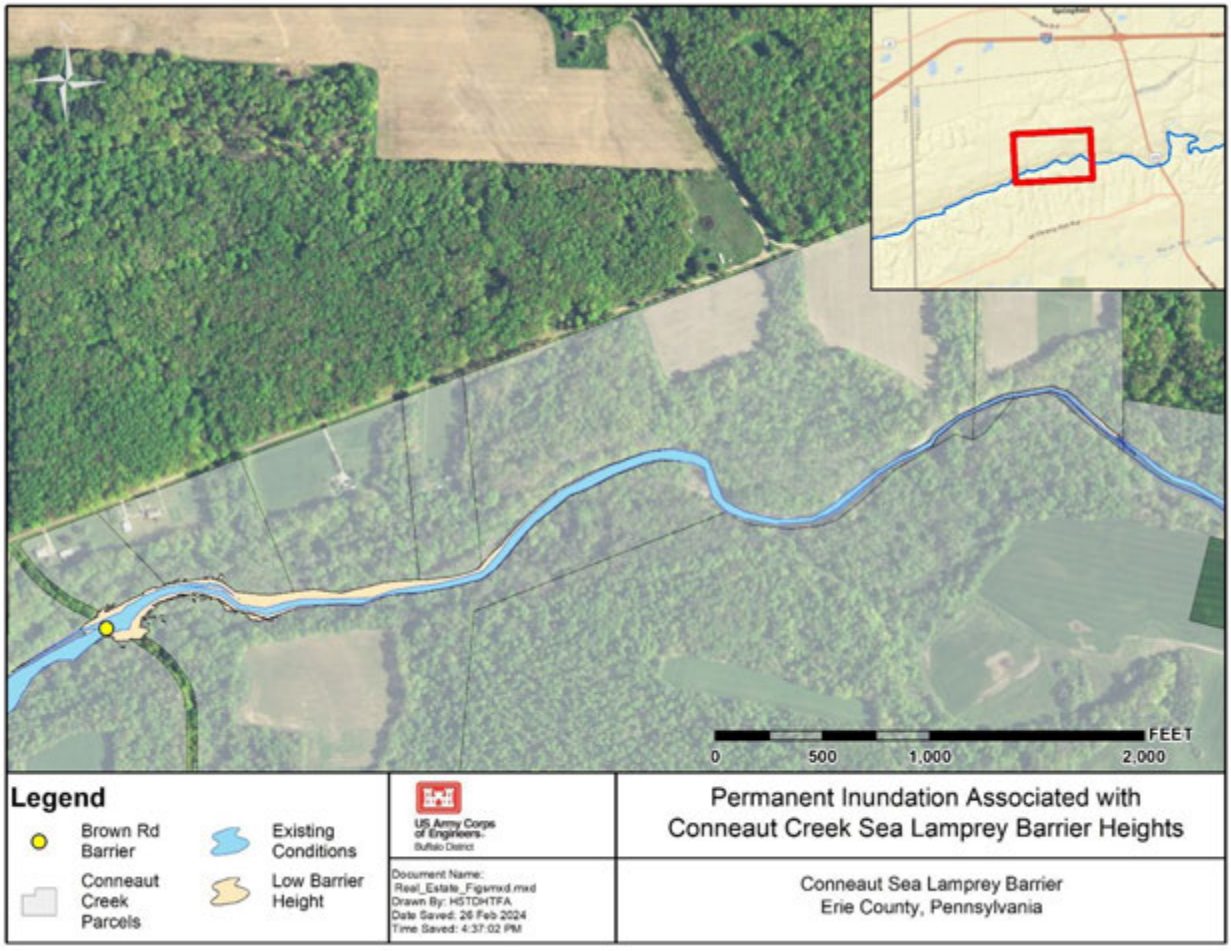


Figure 28. Permanent (Baseflow) Inundation for Brown Road Barrier – Low Barrier Design Scenario Compared to Existing Baseflow Conditions

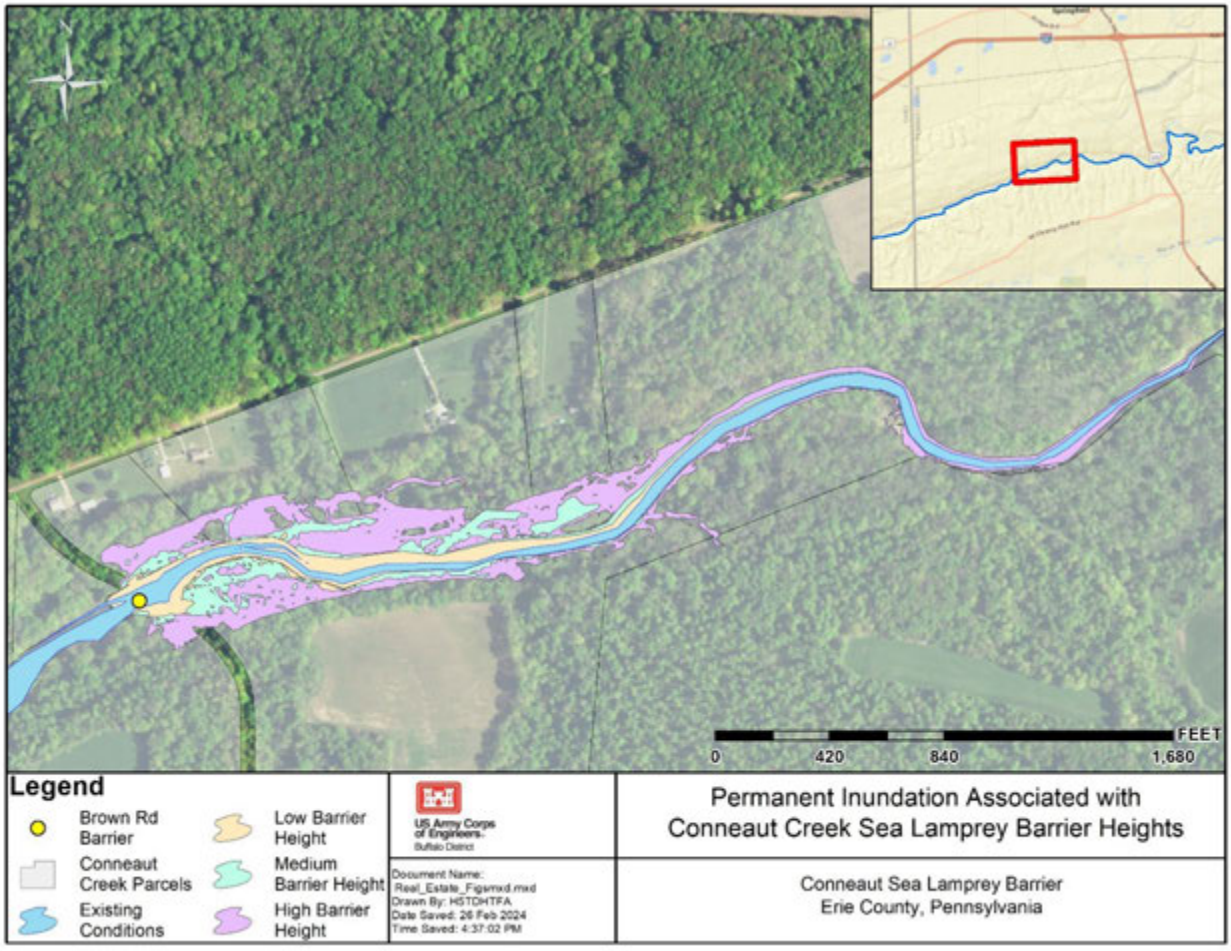


Figure 29. Comparison of Brown Road Barrier Design Scenarios Permanent Inundation

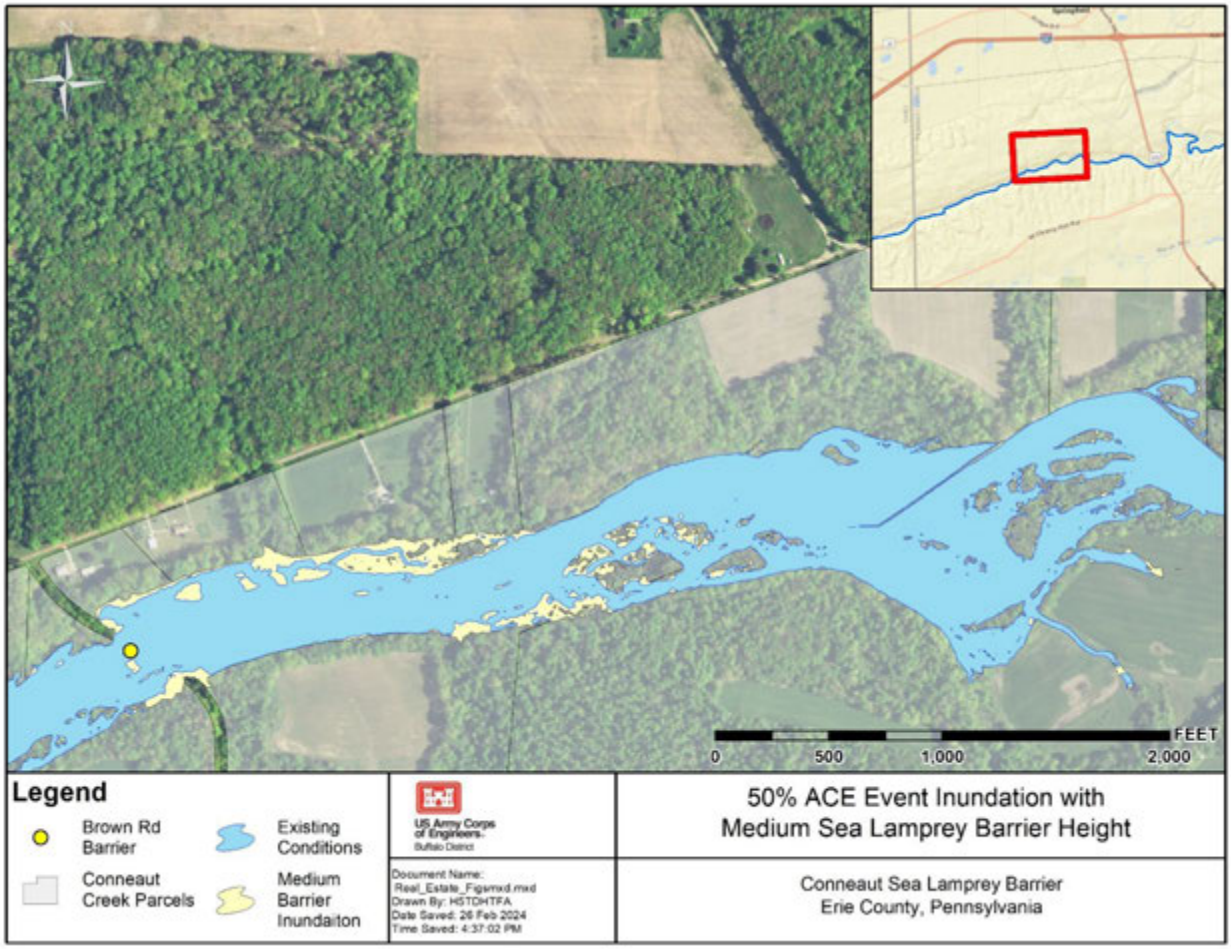


Figure 30. 50% (2-Year) ACE Event with Brown Road Barrier – Medium Design Scenario Compared to Existing 50% ACE Event

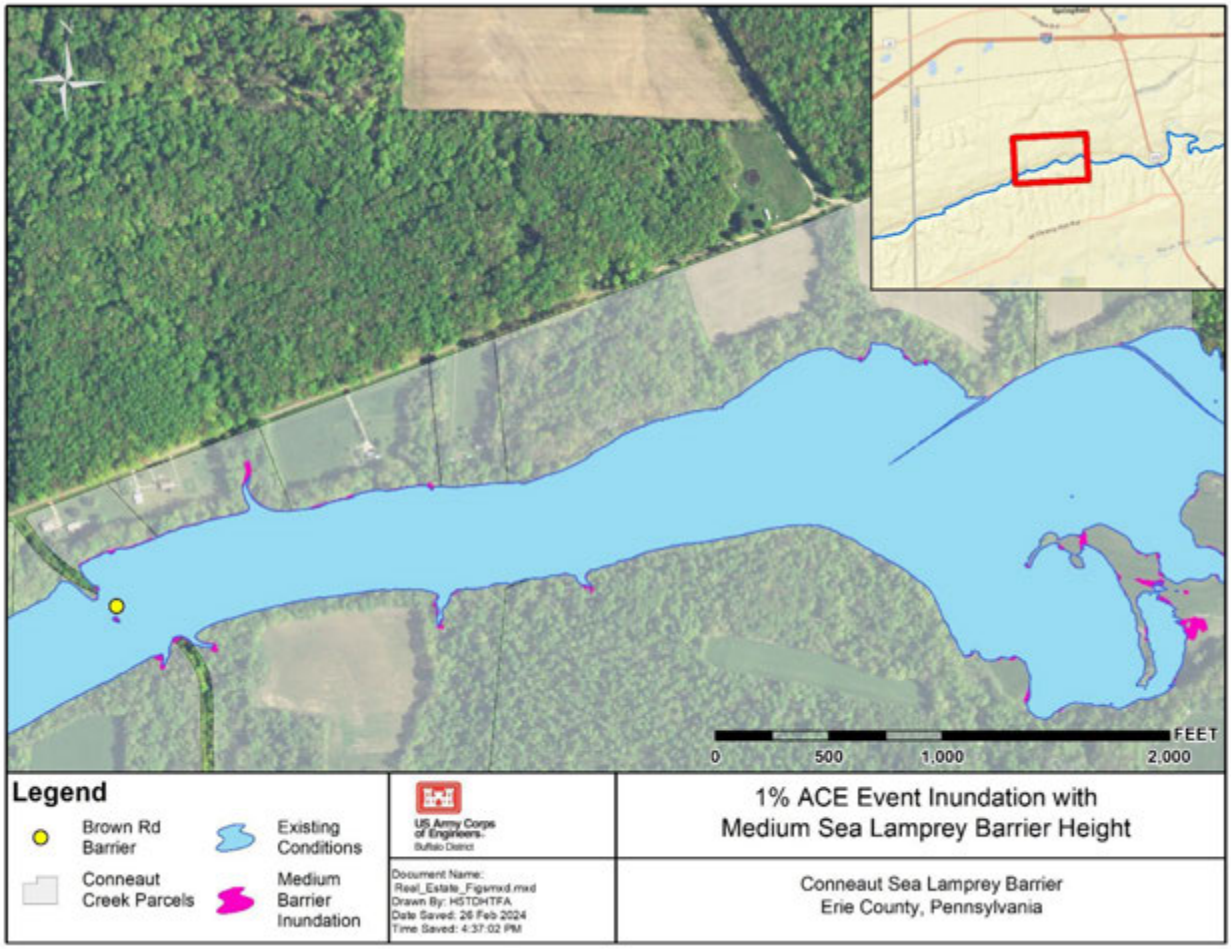


Figure 31. 1% (100-Year) ACE Event with Brown Road Barrier – Medium Design Scenario Compared to Existing 1% ACE Event

Table 7. Summary of Barrier Impacts Associated with All Modeled Barrier Heights at Brown Road

Barrier	Q (cfs)	Barrier Elevation (ft)	Barrier Height (ft)	Baseflow Increase (ft)	Inundation (acres)	Inundation (River Miles)	Inundation (# parcels)
25% Exc. +18"	330	781.5	4.5	3.73	5.23	1.06	11
10% Exc. +18"	735	782.5	5.5	4.73	7.56	1.06	11
5% Exc. +18"	1200	783.5	6.5	5.73	9.62	1.06	11
99% ACE + 18"	1375	783.75	6.75	5.98	10.28	1.06	11
2% Exc. + 18"	1900	784.25	7.25	6.48	11.5	1.06	11
67% ACE + 18"	3933	786.5	9.5	8.72	18.64	1.06	11
50% ACE + 18"	4999	787.5	10.5	9.72	21.67	1.06	11

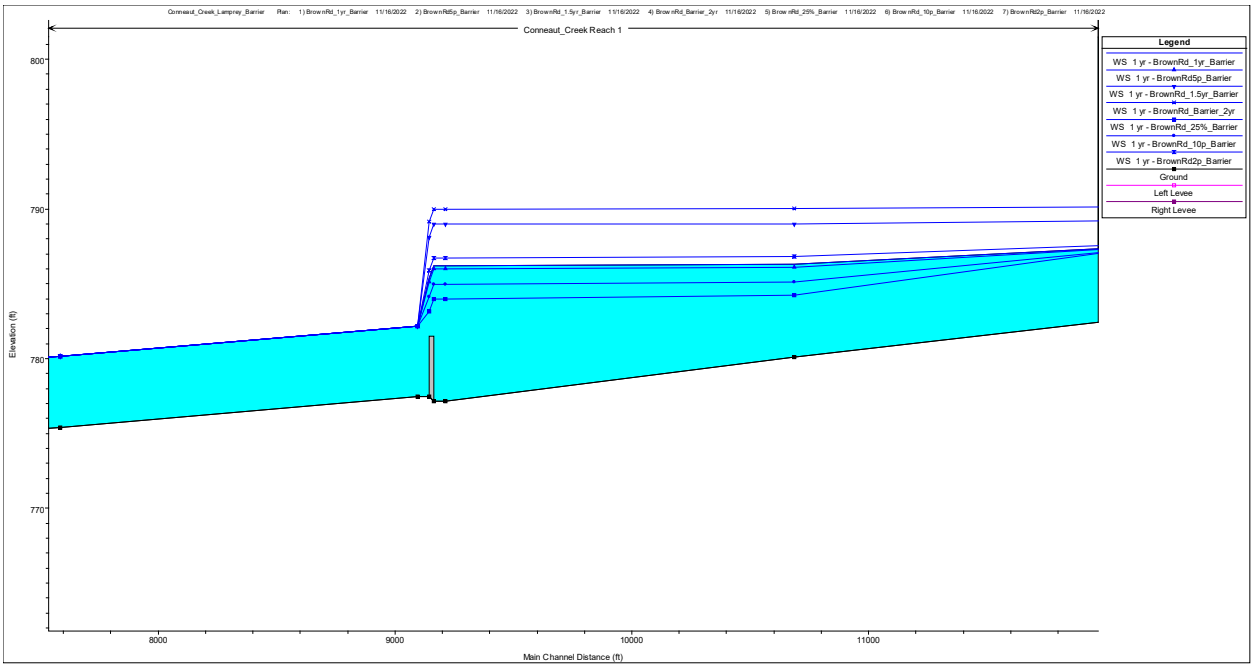


Figure 32. Baseflow WSE at Brown Road for Each of the 7 Low Fixed-Crest/Obermeyer Adjustable Low Crest Barriers

4.5.1.2 Griffey Road

Figure 33 - Figure 35 show the associated inundation at baseflow (95% exceedance flow) for the Griffey Road site for each barrier design scenario, and Figure 36 shows a comparison of all 3 scenarios. Figure 37 and Figure 38 show the impacts associated with the medium design scenario (5% exceedance +18 inches) at the 50% and 1% ACE flows compared to existing conditions. Table 8 shows all modeled low fix-crest/Obermeyer adjustable low crest barriers impacts at the Griffey Road site. Figure 39 shows the WSE at all modeled low fix-crest/Obermeyer adjustable low crest barriers at Griffey Road.

The flow depths at existing conditions compared to the with barrier scenarios were used to determine baseflow increases associated with the barrier immediately upstream of the structure. Baseflow increases from existing conditions are largest immediately upstream of the barrier and decrease upstream as distance from the barrier increases. Inundation acres, river miles, and parcels were determined using ArcGIS to analyze computed HEC-RAS inundation boundaries.

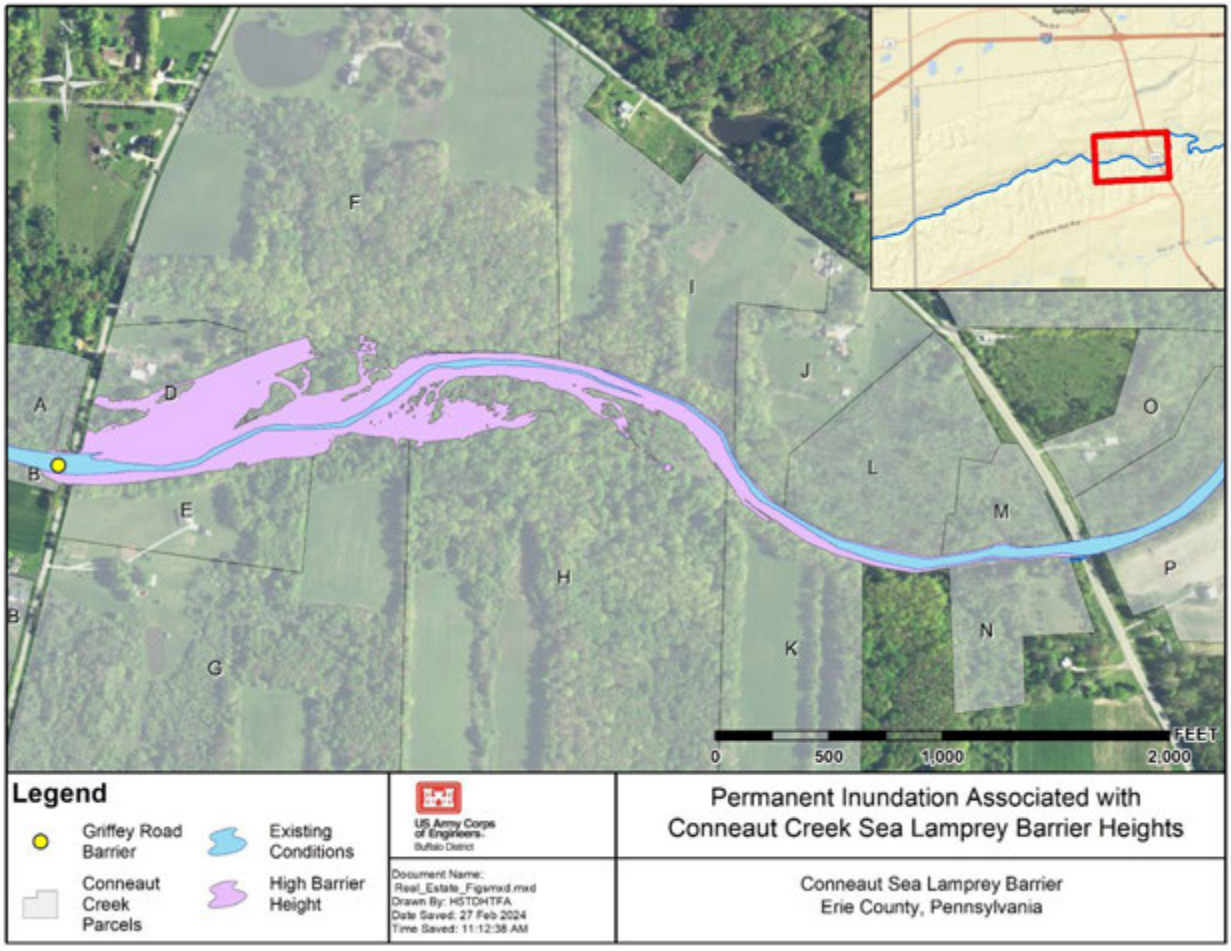


Figure 33. Permanent (Baseflow) Inundation for Griffey Road Barrier – High Barrier Design Scenario Compared to Existing Baseflow Conditions

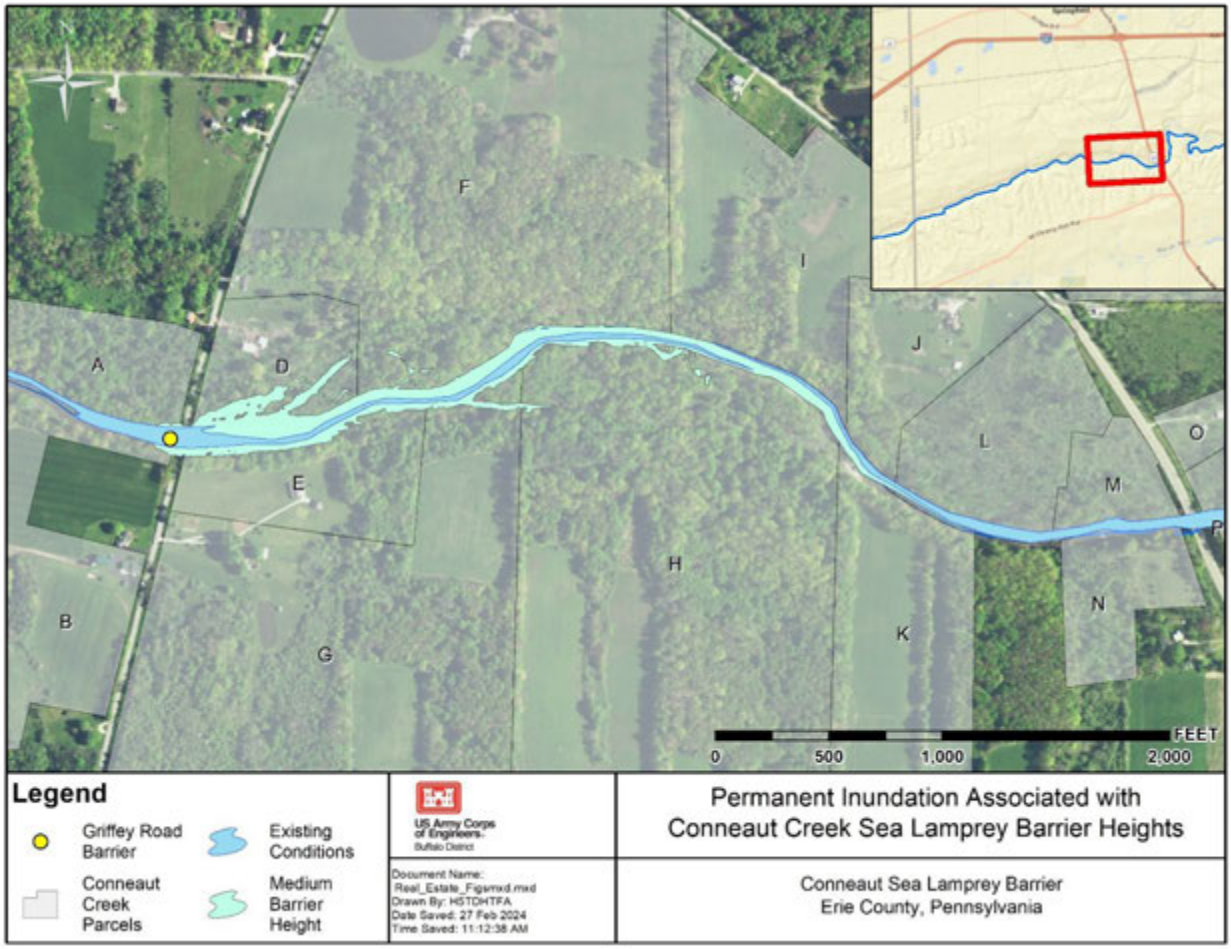


Figure 34. Permanent (Baseflow) Inundation for Griffey Road Barrier – Medium Barrier Design Scenario Compared to Existing Baseflow Conditions

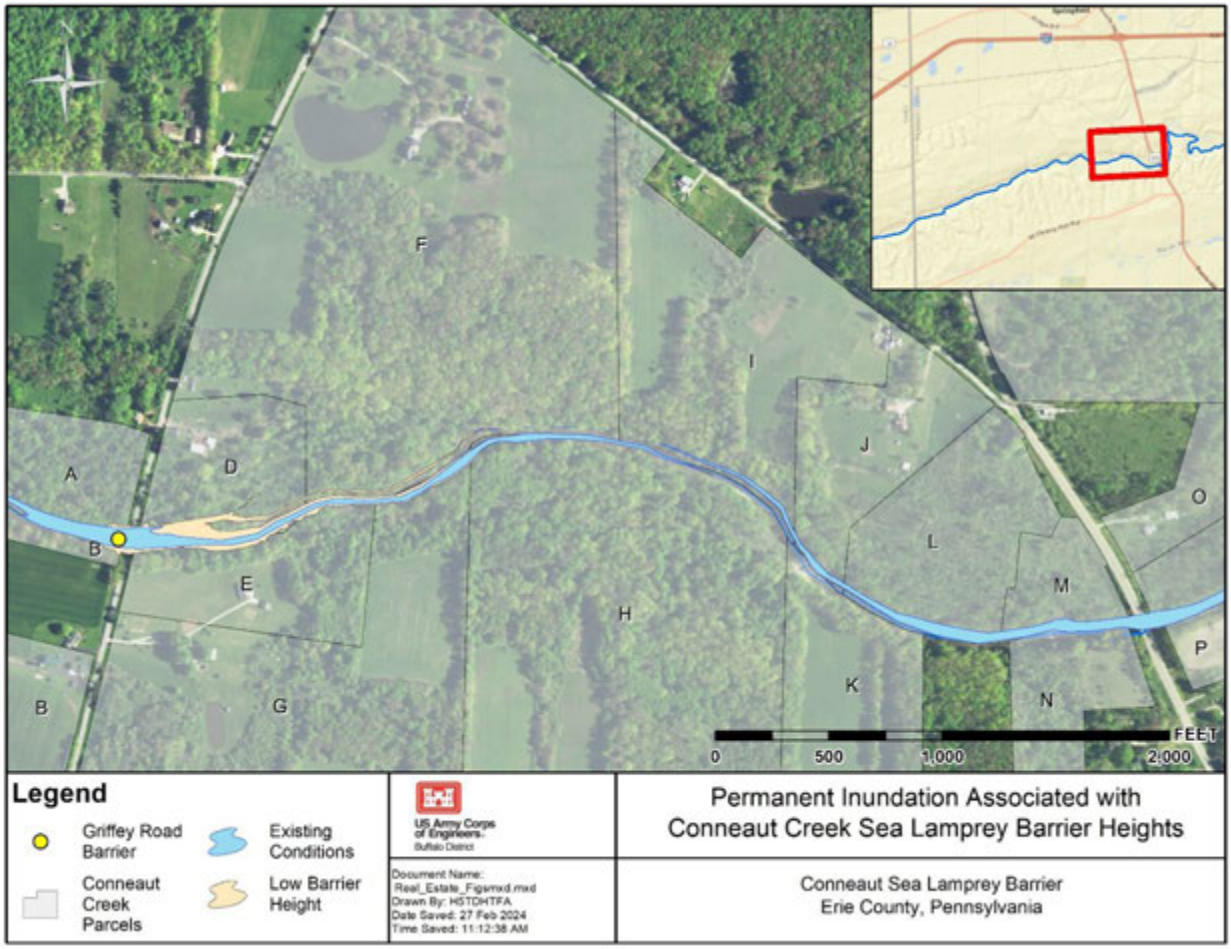


Figure 35. Permanent (Baseflow) Inundation for Griffey Road Barrier – Low Barrier Design Scenario Compared to Existing Baseflow Conditions

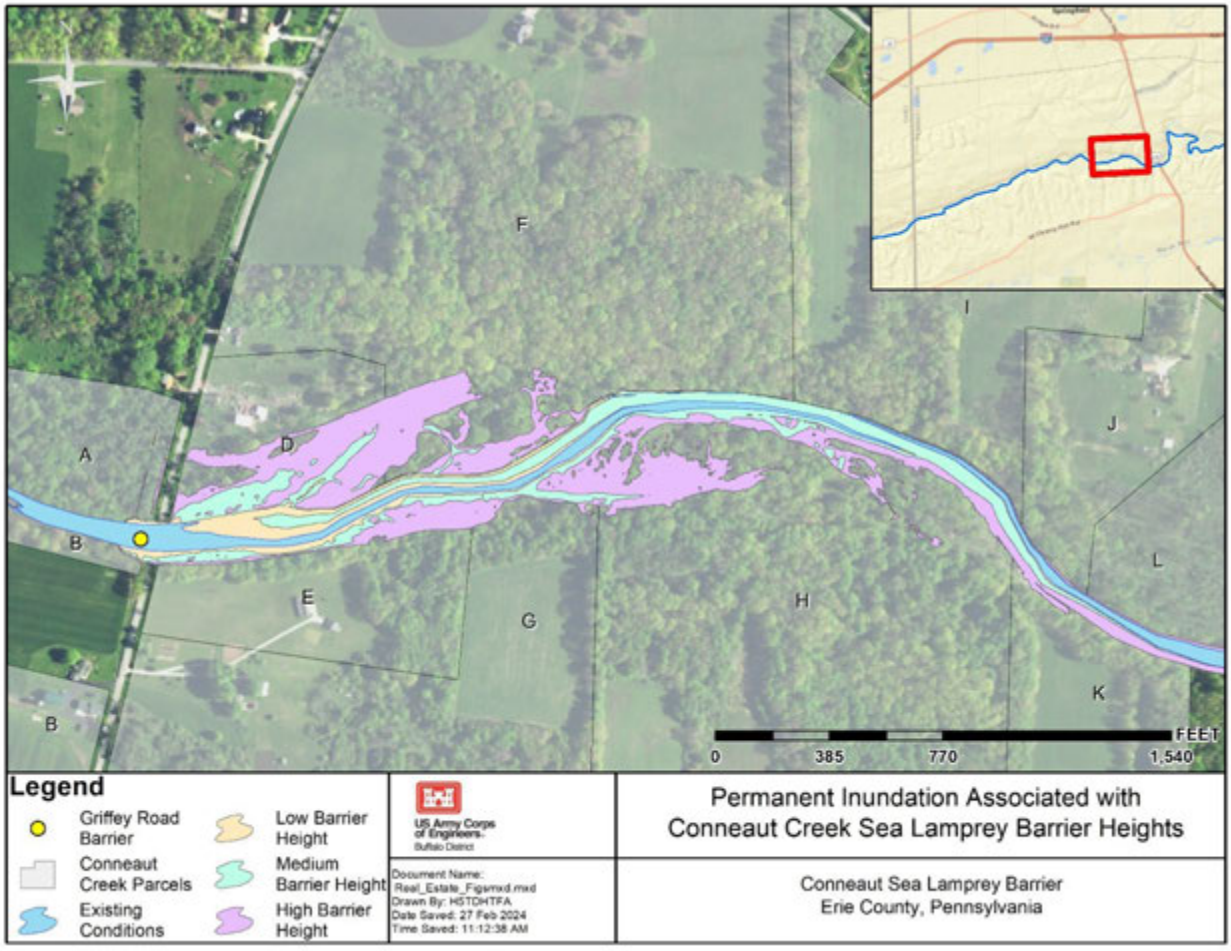


Figure 36. Comparison of Griffey Road Barrier Design Scenarios Permanent Inundation

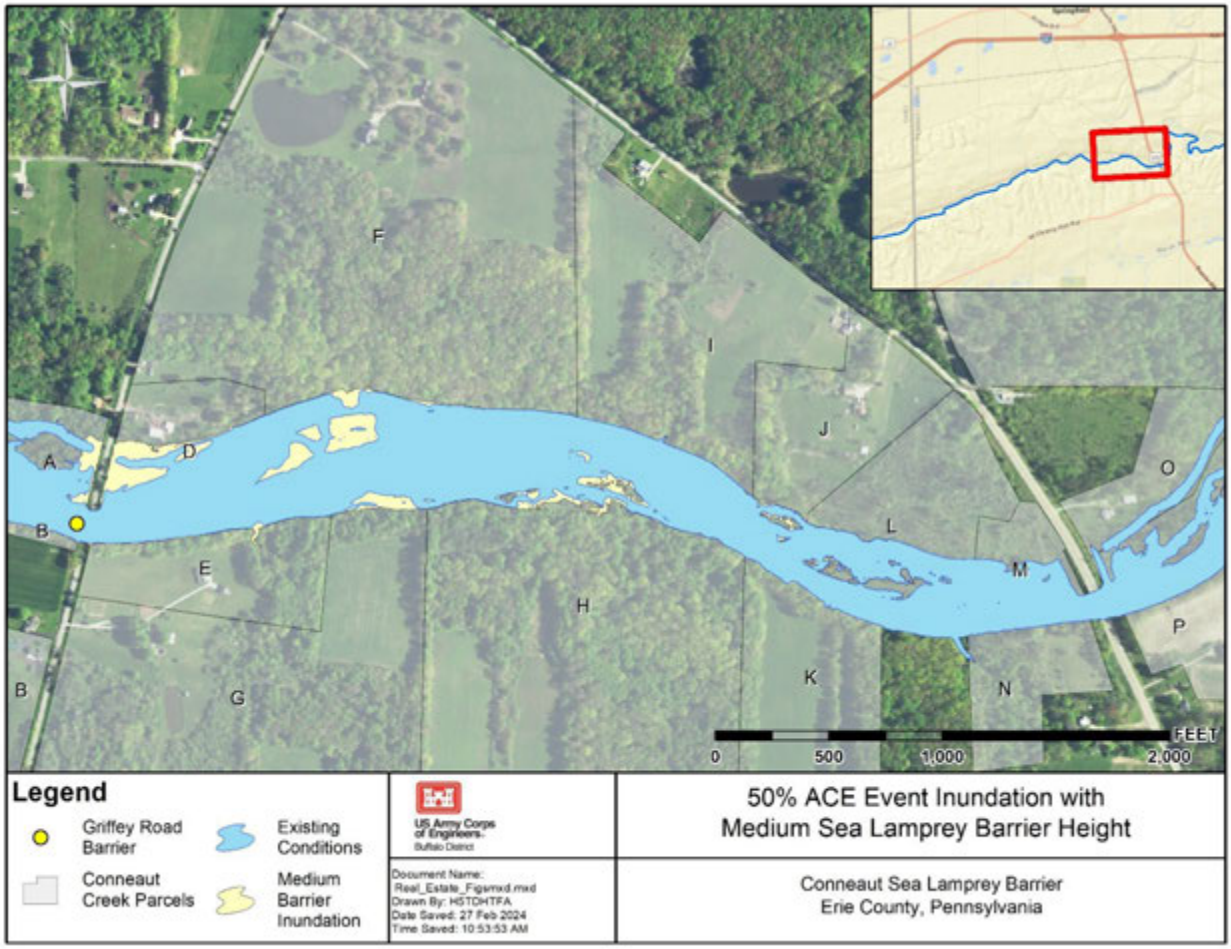


Figure 37. 50% (2-Year) ACE Event with Griffey Road Barrier – Medium Design Scenario Compared to Existing 50% ACE Event

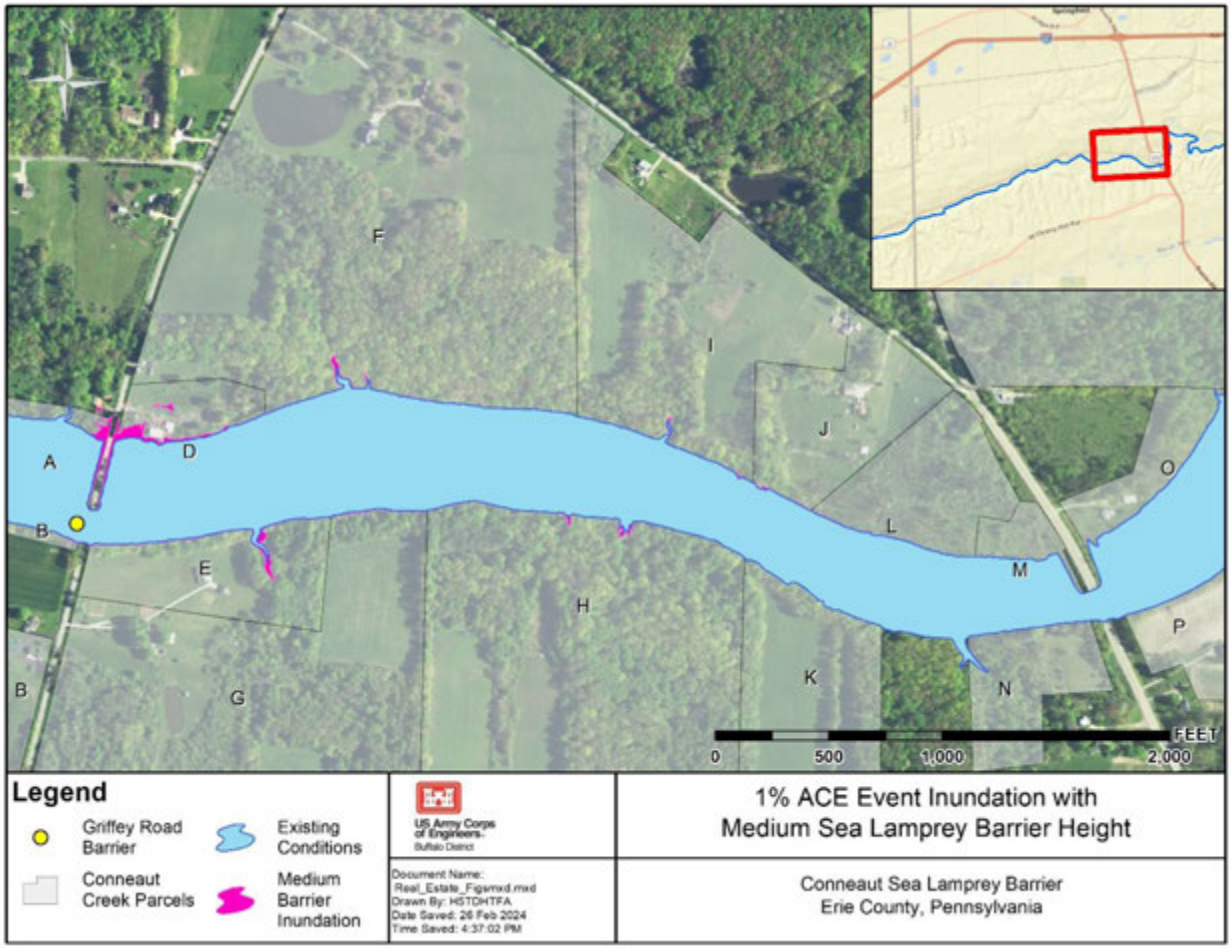


Figure 38. 1% (100-Year) ACE Event with Griffey Road Barrier – Medium Design Scenario Compared to Existing 1% ACE Event

Table 8. Summary of Barrier Impacts Associated with All Modeled Barrier Heights at Griffey Road

Barrier	Q (cfs)	Barrier Elevation (ft)	Barrier Height (ft)	Baseflow Increase (ft)	Inundation (acres)	Inundation (River Miles)	Inundation (# parcels)
25% Exc. +18"	330	794	5	3.97	3.2	0.37	7
10% Exc. +18"	735	795	6	4.96	6.7	0.55	8
5% Exc. +18"	1200	796	7	5.96	10.78	0.81	12
99% ACE + 18"	1375	796.25	7.22	6.21	11.83	0.82	12
2% Exc. + 18"	1900	797	7.97	6.96	14.51	0.84	14
67% ACE + 18"	3933	798.75	9.72	8.7	22.48	1.01	16
50% ACE + 18"	4999	799.75	10.72	9.71	27.37	1.16	16

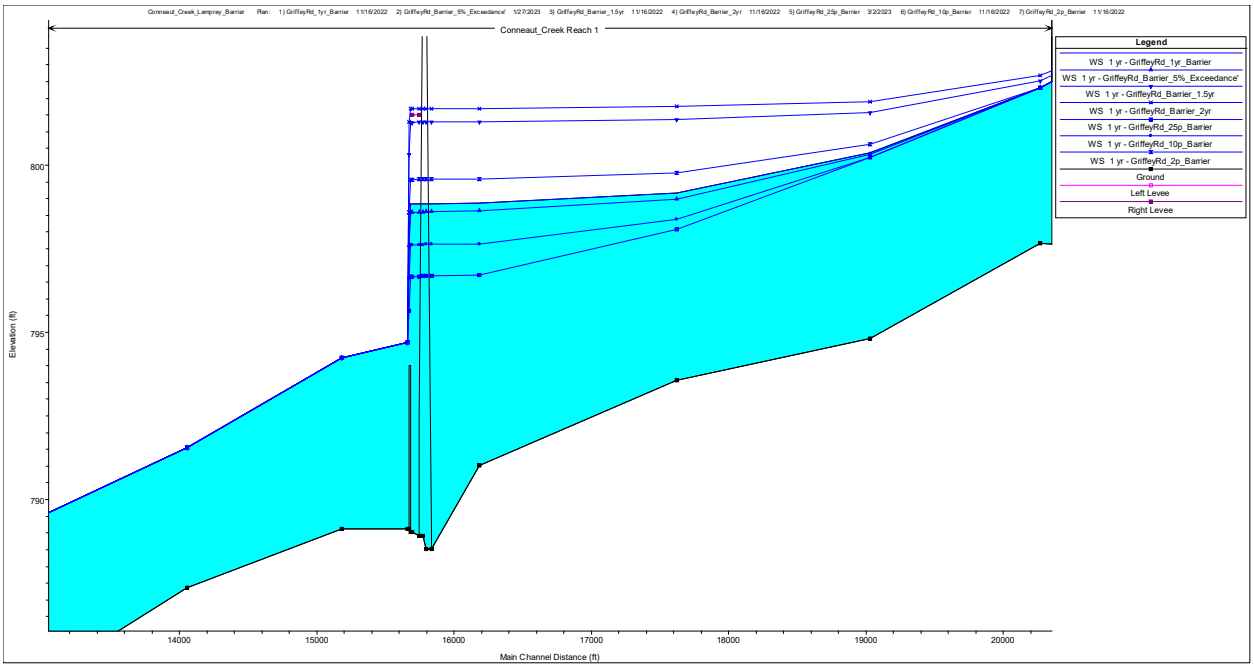


Figure 39. Baseflow WSE at Griffey Road for Each of the 7 Low Fixed-Crest/Obermeyer Adjustable Low Crest Barriers

4.5.2 Electric Only Barrier

The electric only barriers at Brown and Griffey Road modeled as a flat sill across Conneaut Creek slightly above the channel invert elevation. Since main channel conveyance is maintained with this barrier, minimal impacts to WSE upstream are incurred for all flow conditions modeled (95% exceedance to 0.2% ACE). The elevation of the overbanks was a modified where needed to the 10% plus 18-inch tailwater elevation.

4.5.2.1 Brown Road

Minimal impacts at baseflow were observed due to the electric only barrier at Brown Road compared to existing conditions (Figure 40). This increase in WSE is contained within the channel banks. Likewise, the 50% and 1% ACE events with the barrier vs. existing conditions show very minimal impacts to the inundation (Figure 41 & Figure 42). The electric barrier at Brown Road required filling a large portion of the left overbank to create an embankment at 10% ACE plus 18-inch elevation, which contributed to the WSE increases.

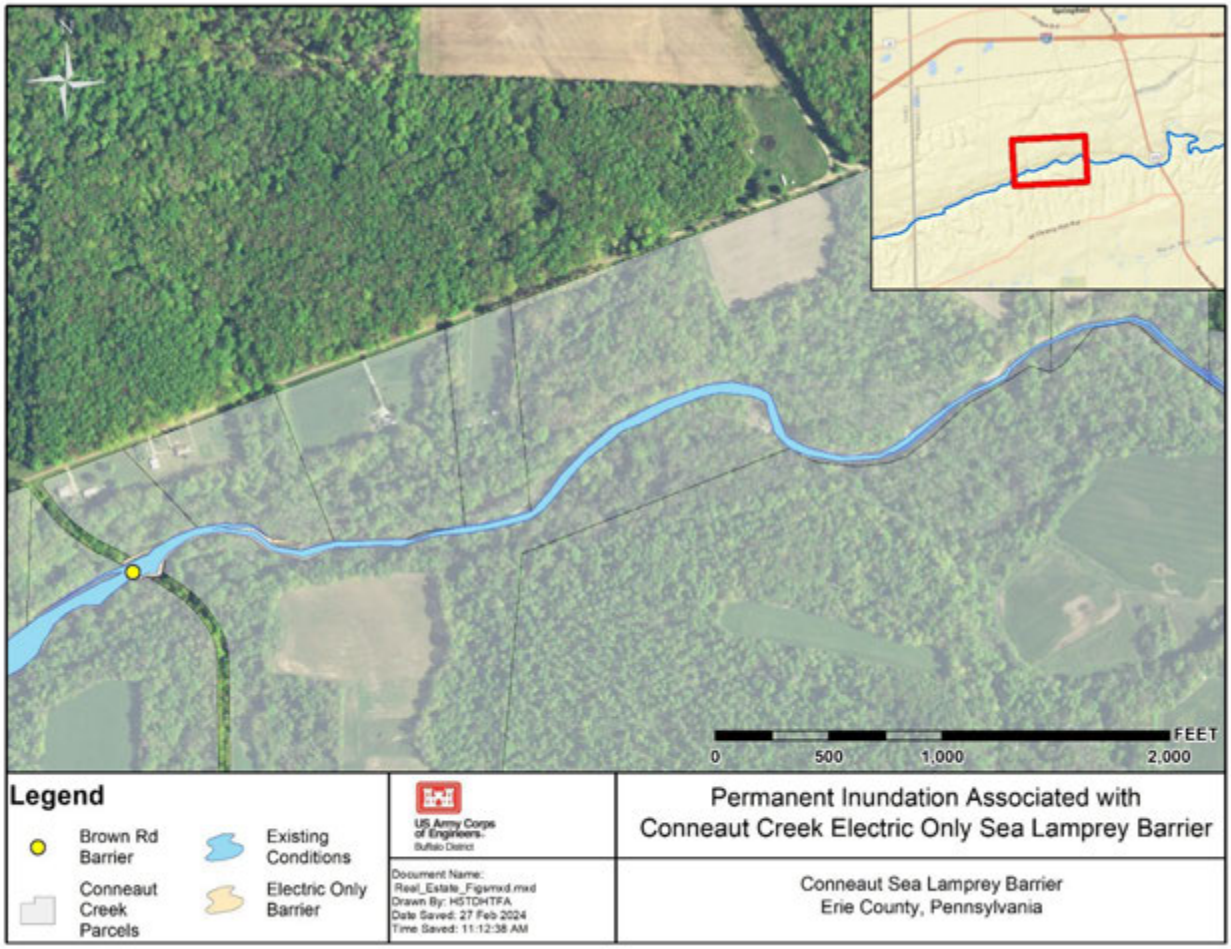


Figure 40. Permanent (Baseflow) Inundation for Brown Road Electric Only Barrier Compared to Existing Baseflow Conditions

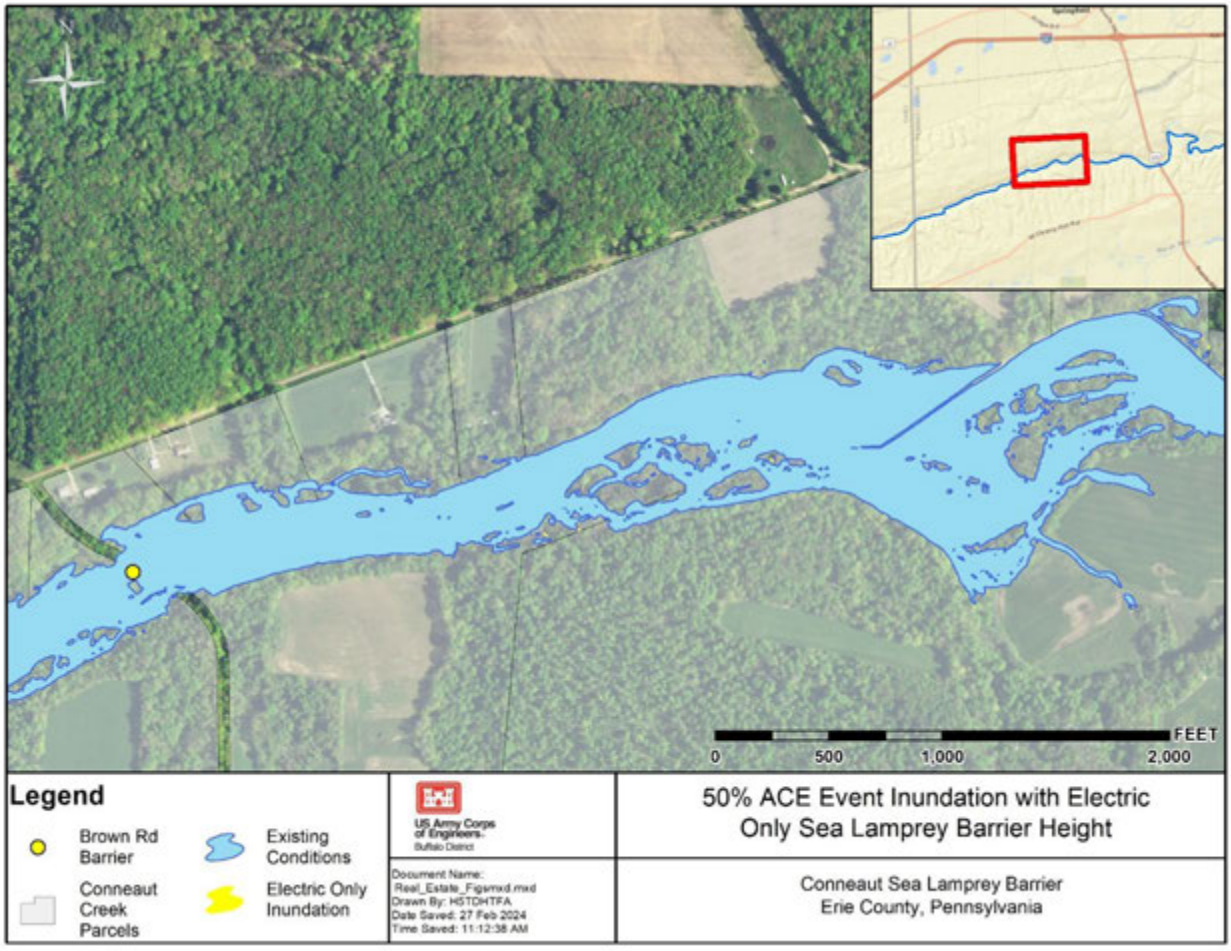


Figure 41. 50% (2-Year) ACE Event with Brown Road Electric Only Barrier Compared to Existing 50% ACE Event

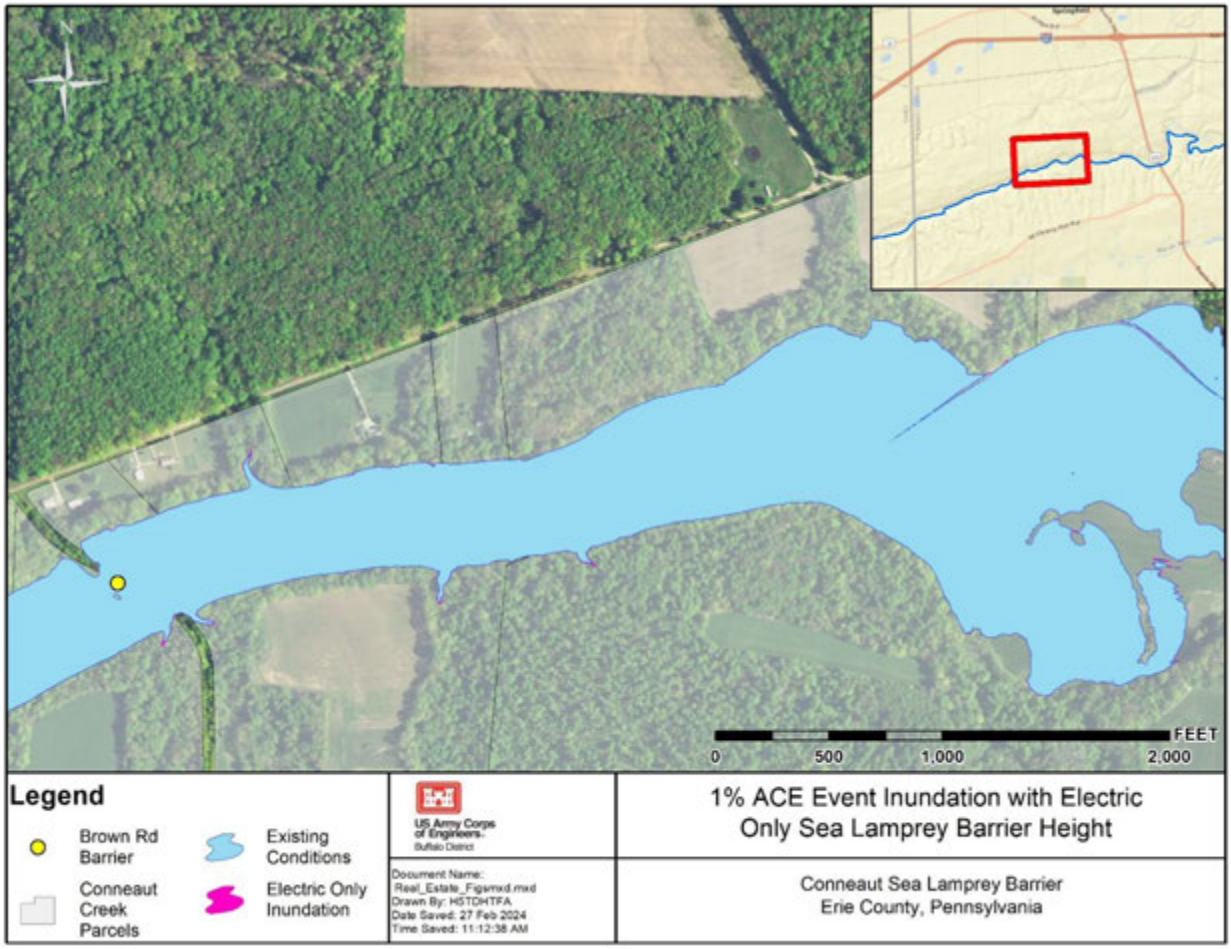


Figure 42. 1% (100-Year) ACE Event with Brown Road Electric Only Barrier Compared to Existing 1% ACE Event

4.5.2.2 Griffey Road

No impacts at baseflow were observed due to the electric only barrier at Griffey Road compared to existing conditions. The 50% and 1% ACE events with the barrier vs. existing conditions show very minimal impacts to the inundation (Figure 43 & Figure 44). The electric barrier at Griffey Road required modifying the model terrain to include an embankment extending downstream from the existing Griffey Road embankment at the 10% ACE plus 18-inch elevation to tie into high ground.

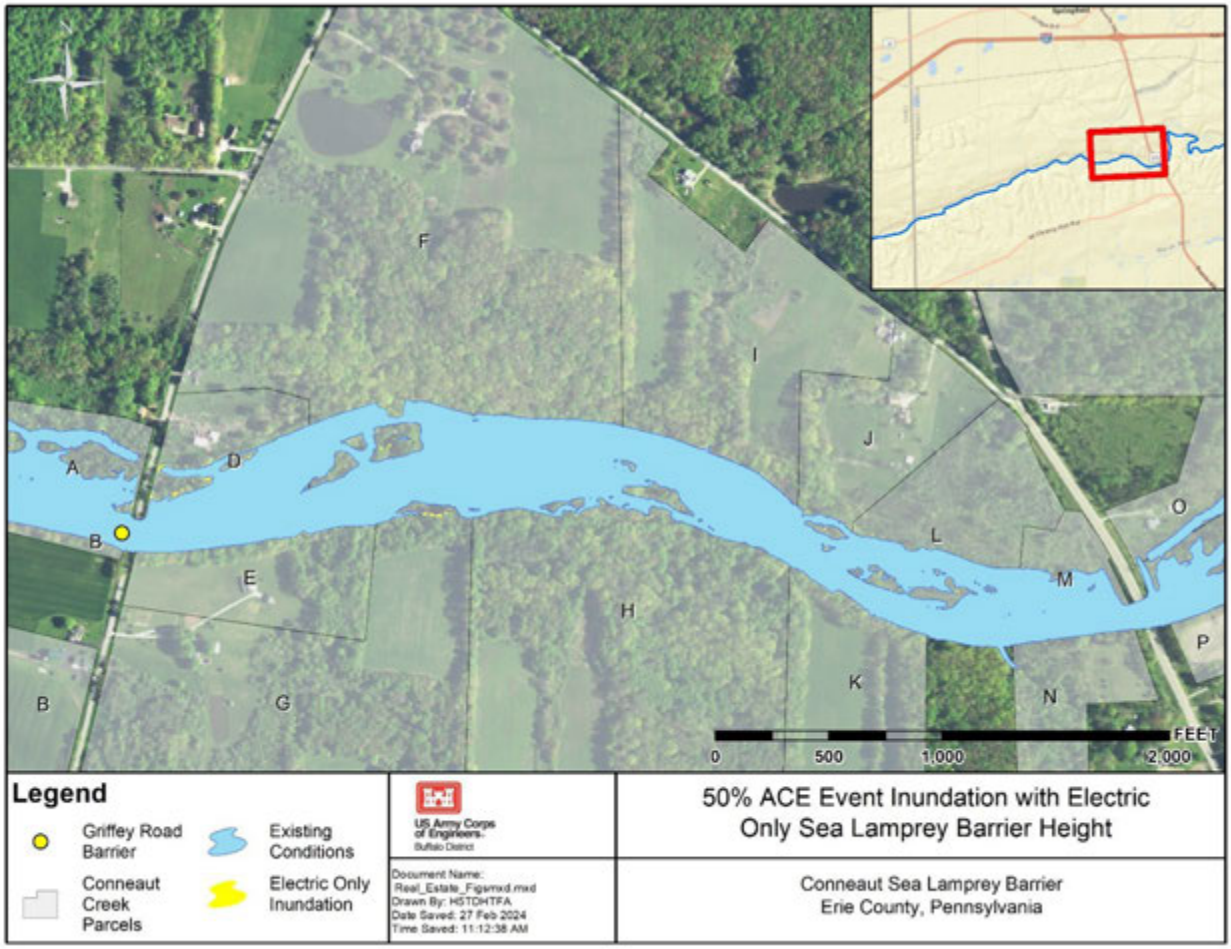


Figure 43. 50% (2-Year) ACE Event with Griffey Road Electric Only Barrier Compared to Existing 50% ACE Event

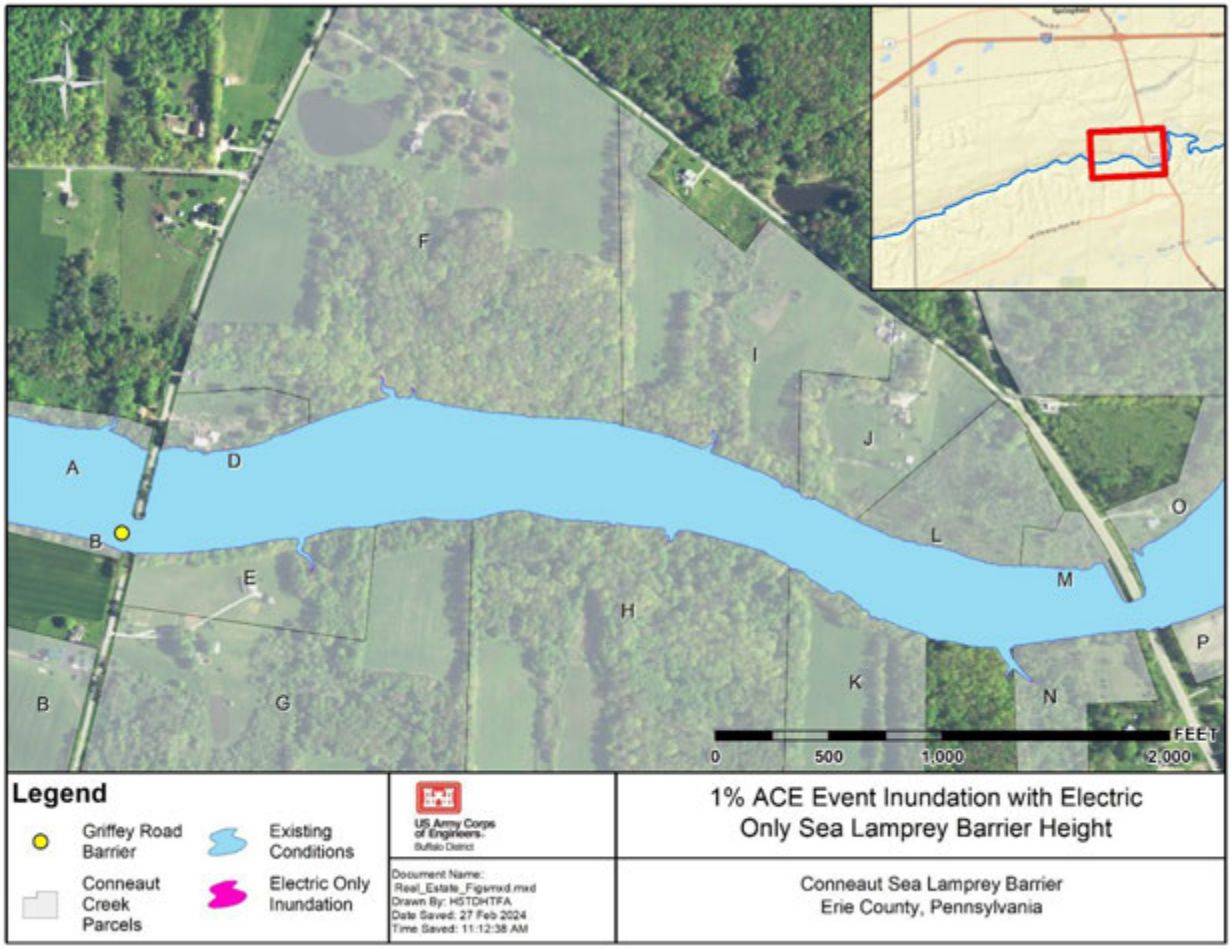


Figure 44. 1% (100-Year) ACE Event with Griffey Road Electric Only Barrier Compared to Existing 1% ACE Event

4.5.3 Electrical Barrier Design

To identify the required electrical barrier components, the variables presented in Table 9 were identified using the HEC-RAS model. The depth and velocity represent the range of values expected over the electrical components during their operation range at both sites. For the low fixed crest barrier medium design scenario, the electrical barrier is located on the weir crest and only in operation once 18 inches of separation from the crest to the tailwater is lost. Therefore, the electrical component is required to be effective for flows larger than the 5% exceedance flows up to the 10% ACE flow. The Obermeyer adjustable crest operates the same way, however since the crest can be uninflated, the electrical components are placed at the base of the structure, resulting in the additional depth of the electrical barrier seen in Table 6. Since the electrical only barrier is located at the channel bottom and required to be on at all times during the migration season, depth and velocity values can approach zero ft (low flow conditions). The width of the electrical components was estimated using the channel width of Conneaut Creek at each barrier location.

Table 9. Electrical Barrier Design Components for Medium Design Scenario and Electric Only Barrier Alternatives at Brown Road and Griffey Road Sites

Site	Type	Required Anode Effective Depth (ft)	Required Anode Effective Velocity (ft/s)	Width (ft)
Brown Road	Low Fixed-Crest & Electrical	2.5 - 8.0 +	2 - 5.5 +	116
	Obermeyer Low Crest & Electrical	4.5 - 11 +	3 - 6.5 +	116
	Electrical Only	0 - 11 +	0 - 6.5 +	116
Griffey Road	Low Fixed-Crest & Electrical	2.5 - 8.0 +	2 - 7.5 +	122.5
	Obermeyer Low Crest & Electrical	5.5 - 11 +	2.75 - 8.5 +	122.5
	Electrical Only	0 - 11+	0 - 8.5 +	122.5
+ indicates electric barrier effectiveness expected to extend beyond the required upper limit (10% ACE WSE) in some capacity				

The electrical barrier acts as a secondary barrier to the fixed crest and Obermeyer crest barriers once the crest design flows are exceeded. Table 10 lists the estimated time in days and hours that the electrical barrier would be required to be operated during the sea lamprey spawning season for the associated barrier crest designs. In general, as the design flow frequency increases and the barrier height increases, the duration of electrical barrier operation is decreased. It is important to note that the percent exceedance values were determined by statistical analysis of gage data within Conneaut Creek. These values determine a flow that is exceeded a certain percent of time during the lamprey migration season based on historical data. However, in any given year these values can differ from the calculated values. That is, the 25% exceedance flow value could occur more or less than 25% of time in any given year for example. The operation times are therefore approximate durations that could be expected with each crest design.

The ACE flows were not included in the table since the flows are calculated from annual peak flow data, rather than flows specifically from the sea lamprey migration season. The 1-year and 2-year flows have a 99 and 50 percent chance of occurring within any given year, respectively. However, this flow could or could not occur within the sea lamprey migration season, so it is not a good indicator for estimating electrical barrier operation.

Table 10. Estimated Time During Sea Lamprey Spawning Season Requiring Electrical Barrier Operation for Low Fixed-Crest and Obermeyer Adjustable Barriers

Percent Exceedance Crest Design (%)	Q (cfs)	Operation (days)	Operation (Hours)
25%	330	38.3	918
10%	735	15.3	367
5%	1200	7.7	184
2%	1900	3.1	73

5. Tentatively Selected Plan

The Tentatively Selected Plan (TSP) was identified as the Obermeyer Adjustable Low Crest Barrier Alternative at the Griffey Road site with the 25 percent exceedance plus 18-inch crest elevation and secondary electrical barrier. The Obermeyer barrier will be physically braced once fully raised (5 ft height) and remain in this position for the duration of the migration season. Once the 18 inches of separation between the Obermeyer Crest and the tailwater is lost, the electrical barrier is utilized as a primary means to block lamprey. Table 11 summarizes the hydraulic analysis for the TSP barrier design.

Table 11. Summary of Hydraulic Analysis Results for the TSP Barrier Design

Barrier	Site	Q (cfs)	Barrier Elevation (ft)	Barrier Height (ft)	Baseflow Increase (ft)	Inundation (acres)	Inundation (River Miles)	Inundation (# parcels)
25% Exc. +18"	Griffey Road	330	794	5	3.97	3.2	0.37	7

Fish passage measures for the barrier include a trap and sort operation and a jumping pool for passage during the sea lamprey migration season. Outside of the lamprey migration season, the Obermeyer Barrier is deflated completely, resulting in unimpeded fish passage upstream and downstream of the barrier as well as minimal flood impacts. A fishway is not necessary with this design as manual sorting from the trap will transport fish over the barrier during the migration season, and not required while the barrier is deflated the rest of the year. A portage route is incorporated to allow paddle sports and other recreationists safe access to upstream and downstream of the barrier. Figure 45 shows the TSP lamprey barrier design. The TSP will be further developed during the design phase of the project. Table 12 summarizes the TSP design of the barrier.

This TSP alternative was chosen as it was determined to be the best buy alternative in terms of cost per average annual habitat units (AAHU), as well as scoring highest on the planning criteria matrix for considering completeness, effectiveness, efficiency, and acceptability of the alternatives. The Griffey Road site was selected over Brown Road mainly due to the level of upstream inundation and number of properties impacted between the two sites (Table 6). Similarly, the 25% exceedance plus 18-inch crest height was chosen as the minimized crest height produces the most acceptable upstream impacts in

terms of inundation. Additional benefits provided by the Griffey Road site that were considered included:

- The barrier will be placed mostly on PAFBC owner property located on the right bank of Conneaut Creek (Parcel A).
- Accessibility for construction on the PAFBC property is high due to the proximity to Griffey Road.
- The existing Griffey Road bridge embankment presently acts as a large constriction within the floodplain, therefore placing the barrier immediately downstream of the embankment helps reduce impacts to the floodplain upstream.
- Two of the impacted landowners adjacent to the site are currently in support of the project/study and construction of the barrier.
- Preliminary Coordination with Pennsylvania Department of Transportation (PADOT) identified no issues with the barrier construction downstream of the bridge.
- Conversations with project partners yielded concurrence that the Griffey Road Site was preferred for the barrier.

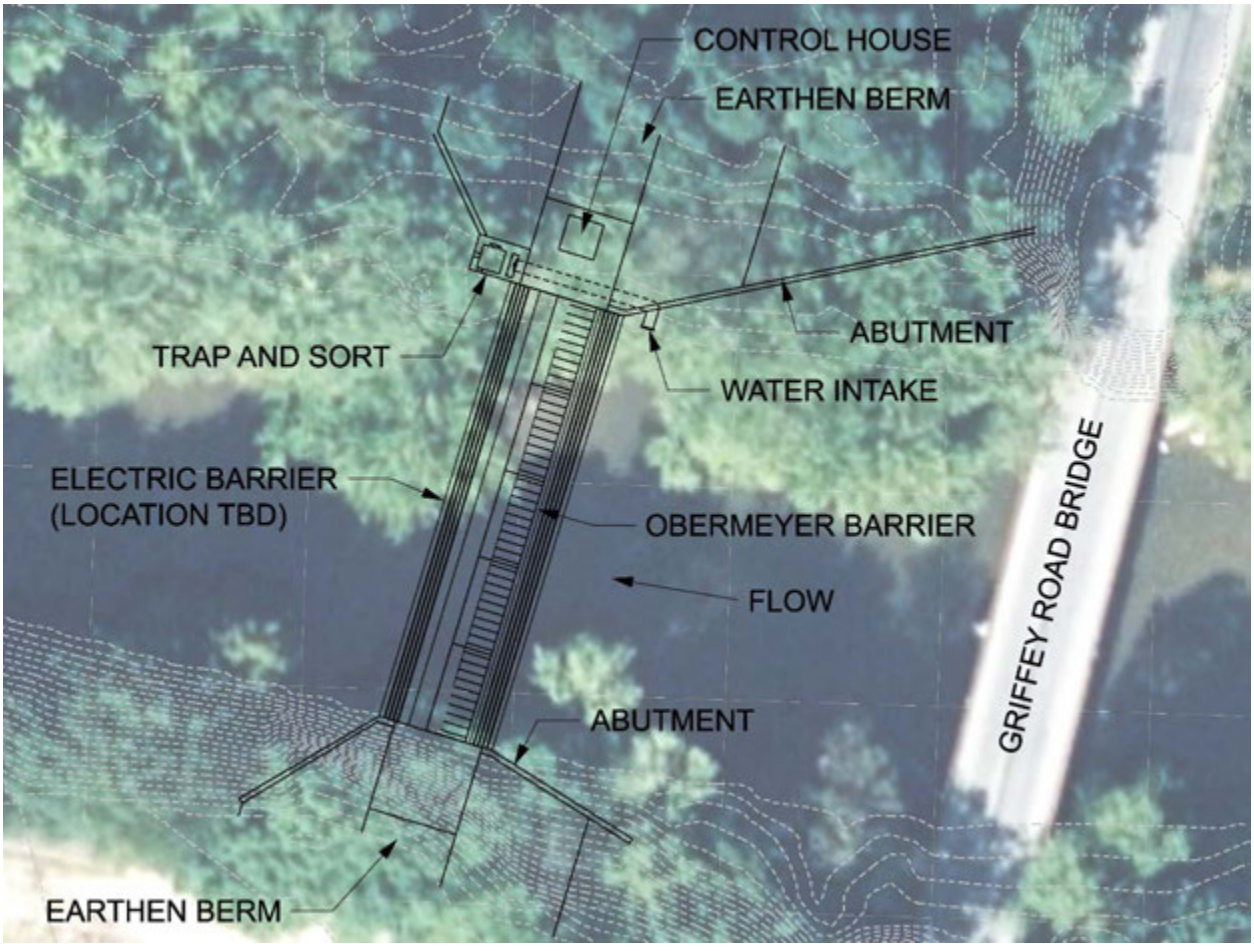


Figure 45. TSP Barrier Alternative: 25% Exceedance Plus 18 Inch Obermeyer Adjustable Crest Sea Lamprey Barrier with Secondary Electrical Barrier at Griffey Road.

Table 12. TSP Design Dimensions Summary

Design Element	Dimensions	
Obermeyer Gate Height	5.0	ft
Obermeyer Crest Elevation	794.0	ft NAVD88
Barrier Width	110.0	ft
Tie-In Abutment Length	90.0	ft
Tie-In Abutment Elevation	801.5	ft NAVD88
Required Anode Effective Depth	3.5 – 10.75	ft
Required Anode Effective velocity	1.5 – 8.5	ft/s

6. Flood Impact Assessment

The potential impacts of the TSP sea lamprey barrier on flood inundation along Conneaut Creek was analyzed using our HEC-RAS 1D model. The TSP barrier was added to the HEC-RAS model as an inline structure downstream of the Griffey Road bridge. The HEC-RAS Terrain was modified to represent the tie-in abutment wall at the 10% plus 18-inch elevation (801.5 ft NAVD88) for the sea lamprey barrier to the existing roadway embankment (Figure 46). The 99, 67, 50, 20, 10, 2, 1 and 0.2% Annual Chance Exceedance (ACE) flows were modeled, as well as the 2, 5, 10, 25 and 95% exceedance flows.

The 95% exceedance flow was considered the baseflow condition for Conneaut Creek to analyze permanent or still water inundation associated with the barrier. As noted above, the Obermeyer barrier will be fixed in place during the migration season and will not be operated to adjust the crest elevation based on the tailwater stage. Therefore, the inundation assessed is based on the Obermeyer barrier at the fully raised position (the 25% Exceedance plus 18-inch elevation or 5 ft high) for all flow frequencies. The minimum inundation associated with the barrier is created from the impoundment behind the Obermeyer gates and the water surface elevation of the impoundment is equal to the Obermeyer crest elevation (794 ft). This inundation at the barrier is permanent for the lamprey migration season only (March – July); outside of this window the barrier is deflated and run-of-river conditions return. Similar to the electric only barrier alternative, minimal inundation impacts attributed to the deflated Obermeyer, tie-in abutment, and concrete sill will persist outside of the lamprey migration season.

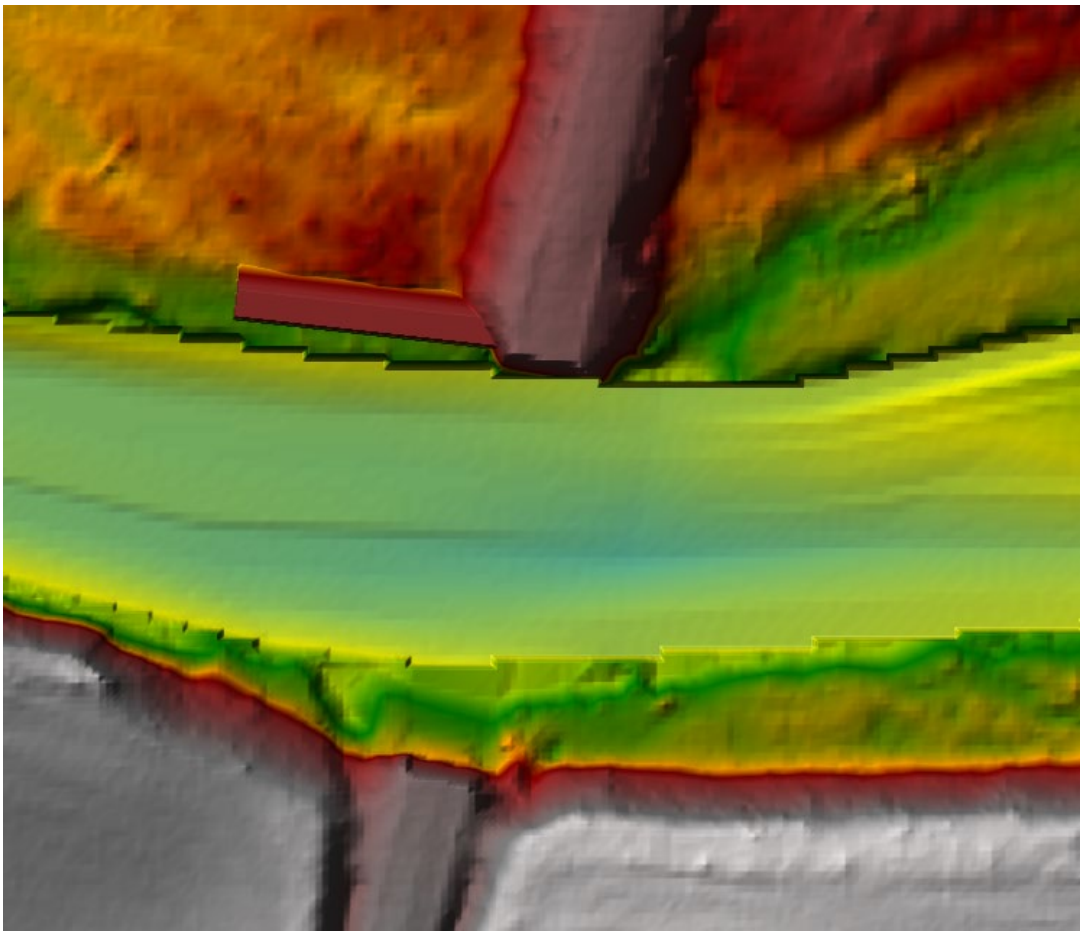


Figure 46. Modified HEC-RAS Terrain Including Tie-In Abutment Wall for Lamprey Barrier to Griffey Road Embankment

When comparing to existing conditions, an increase in water surface elevation can be seen for the TSP lamprey barrier design at all modeled flow frequencies (Table 13). These increases were modeled under the assumption that the Obermeyer barrier stays raised for all flow frequencies greater than the 25% exceedance flow, where the electric barrier is required. All increases in WSE are upstream of the proposed barrier; no increases are observed downstream. Mitigating all impacts on the upstream inundation is not possible due to the nature of the project and increases in WSE were expected. However, the TSP alternative was chosen considering a barrier crest elevation that minimizes upstream impact, while remaining an effective barrier to upstream sea lamprey migration. Figure 47 shows the profile plot of the 1% ACE WSE upstream and downstream of the barrier compared to existing conditions. Figure 48 shows the spatial extent of the increase in inundation at the 1% ACE event.

Table 13. WSE Difference Between Existing Conditions and TSP Barrier for Multiple Flow Frequencies

Flow Frequency	Q (cfs)	Existing WSE (ft NAVD88)	TSP WSE (ft NAVD88)	WSE Difference (ft)
95% Exceedance	7	790.13	794.09	3.96
25% Exceedance	330	792.4	795.06	2.66
10% Exceedance	735	793.48	795.78	2.3
5% Exceedance	1200	794.46	796.44	1.98
99% ACE	1375	794.72	796.66	1.94
2% Exceedance	1900	795.46	797.27	1.81
67% ACE	3816	797.33	799.06	1.73
50% ACE	4897	798.15	799.9	1.75
20% ACE	7230	799.31	801.16	1.85
10% ACE	8842	800.02	802.01	1.99
4% ACE	10909	800.78	802.98	2.2
2% ACE	12495	801.31	803.66	2.35
1% ACE	14069	801.8	804.3	2.5
0.2% ACE	17813	802.79	804.45	1.66

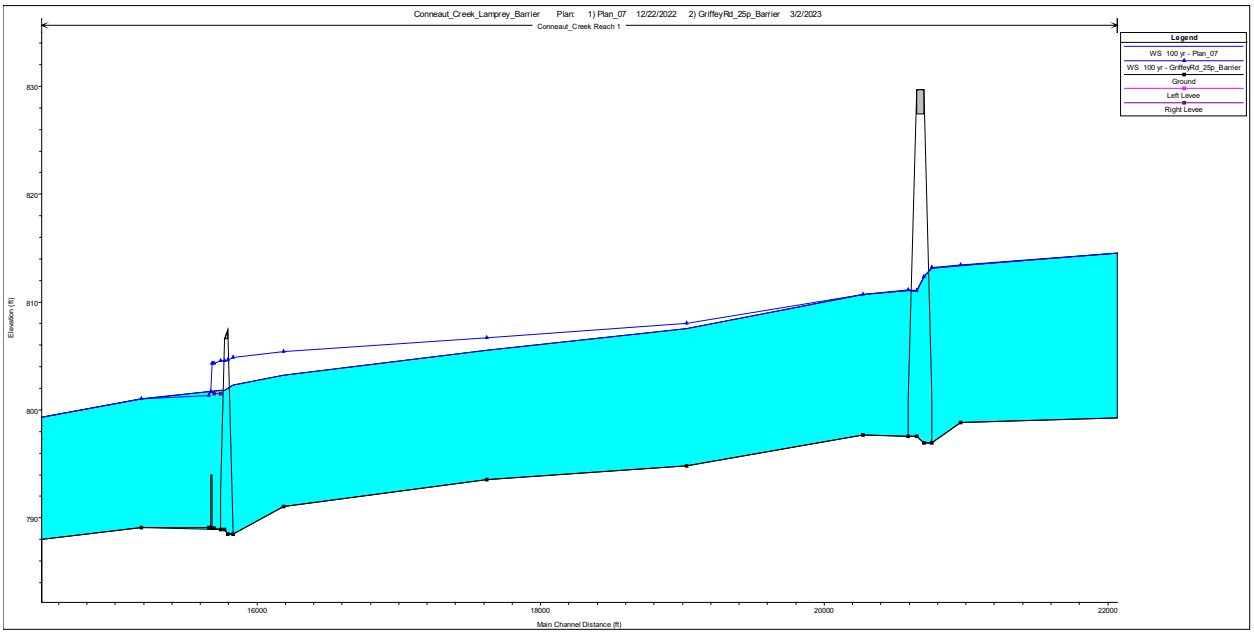


Figure 47. WSE Difference Between Existing Conditions and TSP Barrier for the 1% ACE

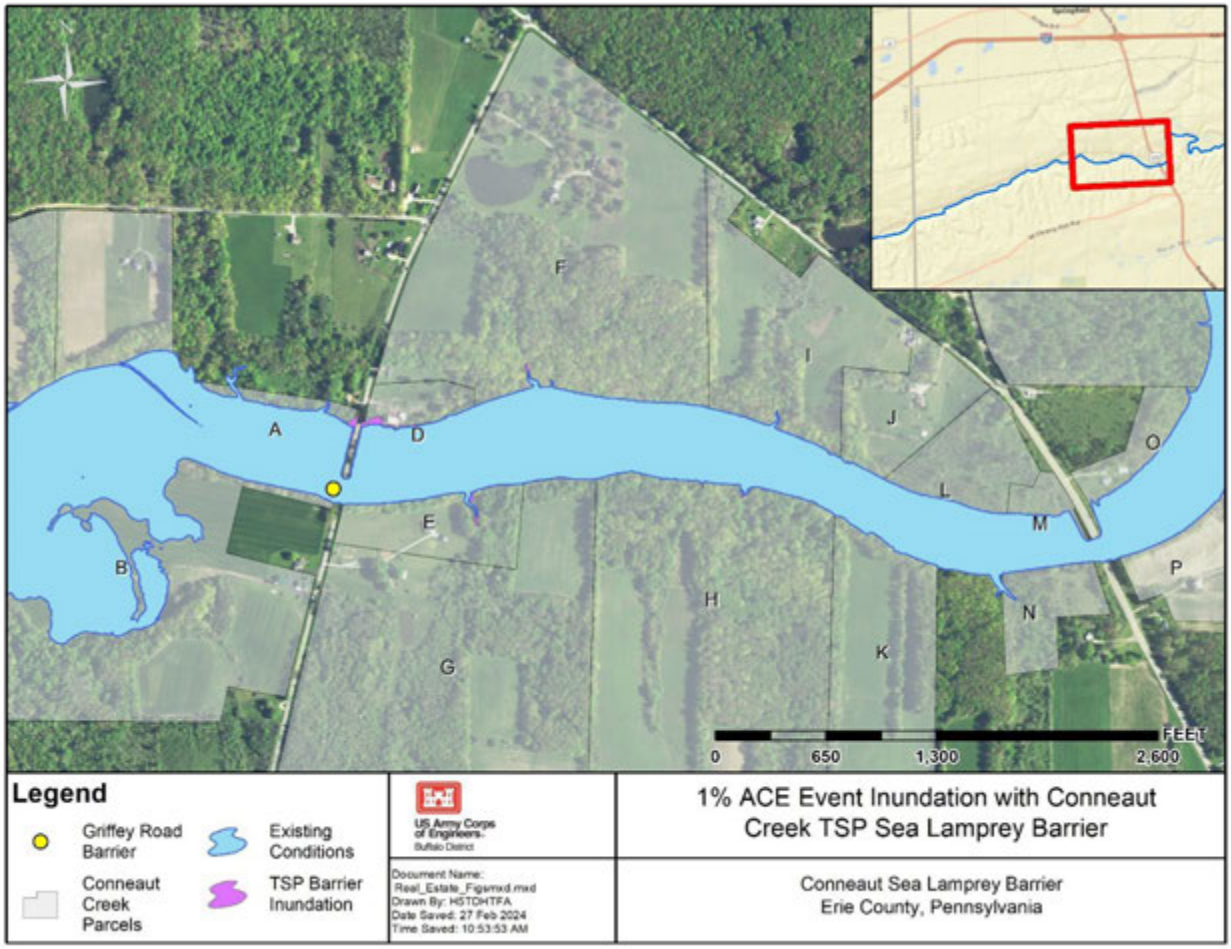


Figure 48. Existing Conditions and TSP Barrier 1% ACE Inundation Extents

Considering the nature of the floodplain topography in the watershed, the increased water surface elevations result in minimal change to the existing inundation extents. The floodplain is highly contained by the steep walls of the narrow valley of Conneaut Creek. The 0.2% ACE (500-year) floodplain is contained within the valley for both existing and with project conditions in most locations (Figure 49). Likely due to the narrow floodplain and flashiness of the creek, no infrastructure or buildings are built within the impacted portion of Conneaut Creek. Therefore, any adverse effects of the increase in water surface elevation are unlikely to occur, even at high flow frequencies.

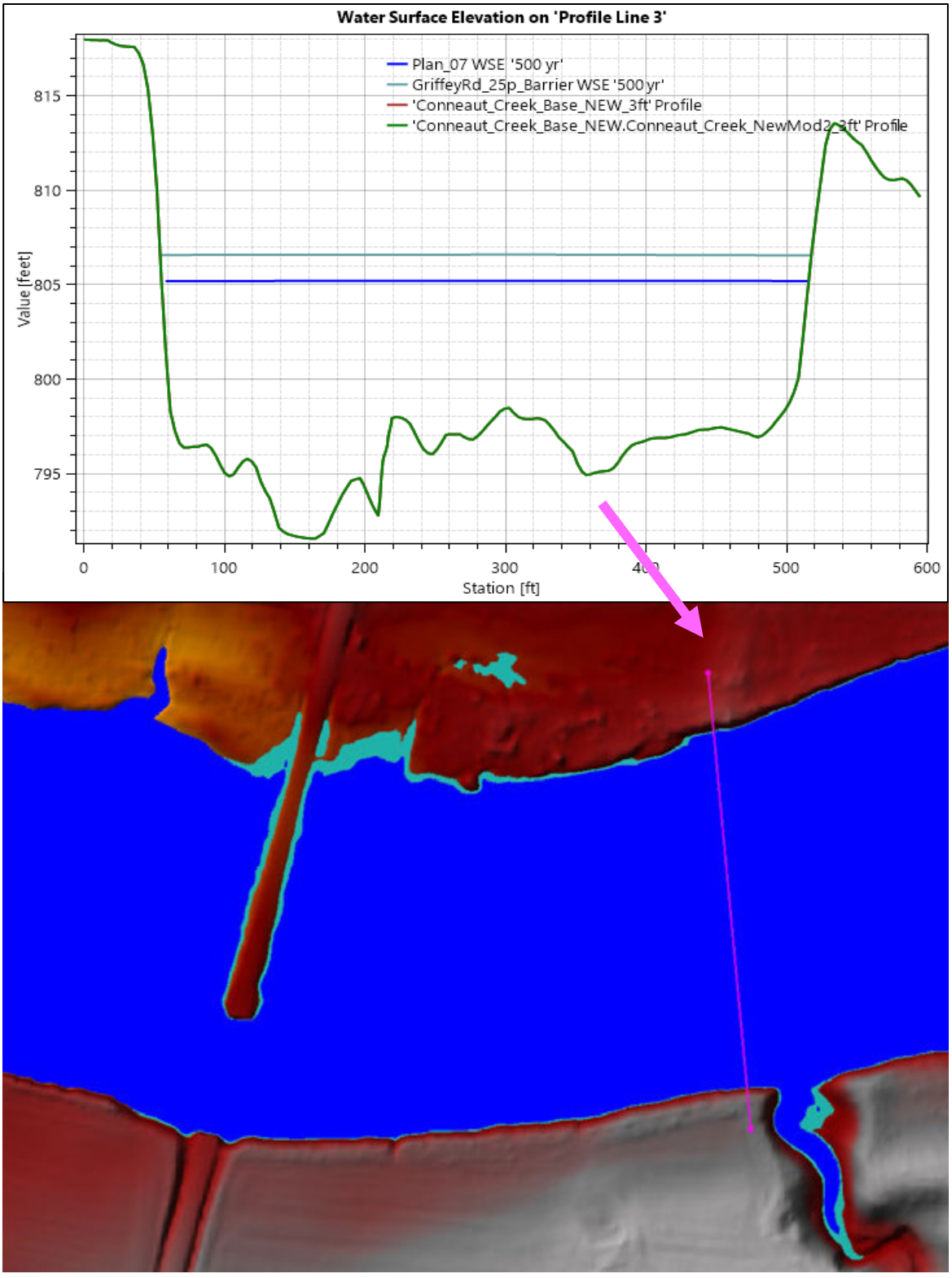


Figure 49. TOP: Cross Sectional View of Existing and TSP 0.2% ACE WSE Upstream of Griffey Road. BOTTOM: Existing Conditions and TSP Barrier 0.2% ACE Inundation Extents at Cross Section.

One area of concern with respect to increased inundation upstream of the barrier is at parcel D, which is located on the right bank immediately upstream of Griffey Road (Figure 50). Model results show the 1% and 0.2% ACE inundation with the TSP barrier approaching the footprint of several barns located on the property. However, the structures are located outside of the modeled 1% and 0.2% floodplain with the TSP design (Figure 51). The HEC-RAS modeling will be updated for the final sea lamprey barrier developed during the design phase of the project. The design will also include the addition of the trap and sort facility, located within floodplain, that currently is not included in the modeling analysis. The results of the final modeling, along with surveys on parcel D, will verify that no structures and other infrastructure are impacted as a result of the barrier construction. A takings analysis will be performed prior to feasibility completion to assess property values and determine any flowage easements.

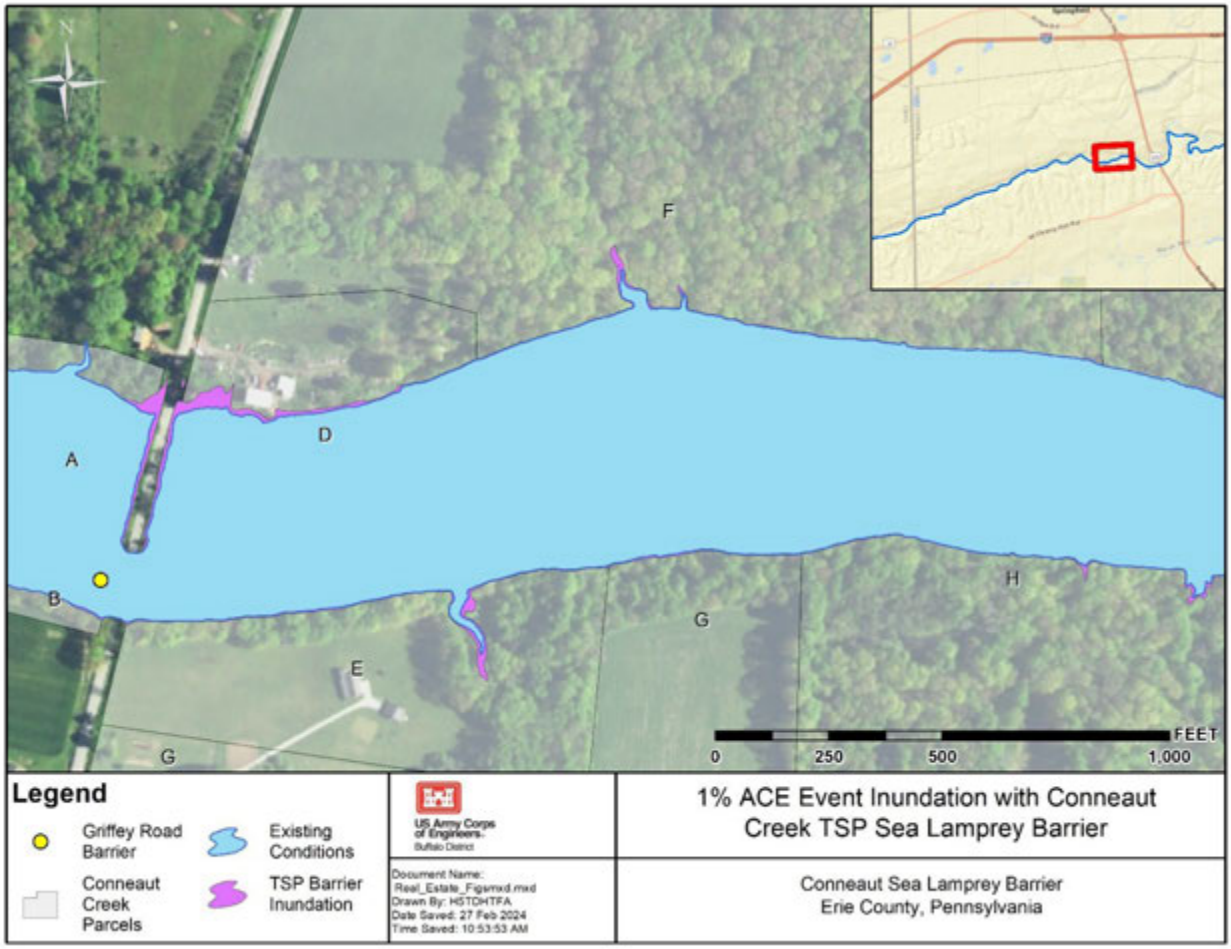


Figure 50. 1% ACE Inundation Immediately Upsteram of Grffey Road at Parcel D

Figure 51. Parcel D Structures Footprints Outside of the 1% ACE TSP Barrier WSE (Orange-Green Gradient) and 0.2% ACE Inundation Extent (Cyan)

The permanent inundation impacts to individual landowners upstream of the barrier were also assessed on a per parcel basis. Figure 52 shows the permanent inundation extents compared to existing conditions. Per Table 8, the permanent inundation increases the WSE a maximum of 3.97 ft at the barrier, inundates 3.2 acres (1.77 additional acres beyond existing conditions), and extends 0.37 miles upstream impacting 7 landowners. Table 14 compares the existing WSE and inundation on each of the 7 impacted parcels at baseflow to the TSP barrier and displays the difference in inundation acreage and WSE. Increases in WSE elevation decrease moving upstream from the barrier. The increased acreage of inundation is a function of proximity to the barrier, as well as linear feet of streamfront along the parcels. Parcels D and E experience the largest increases in permanent inundation due to the barrier. Table 15 displays the inundation at existing and TSP barrier conditions as acreage and as a percentage of the total parcel acreage, as well as the increase in percent inundated.

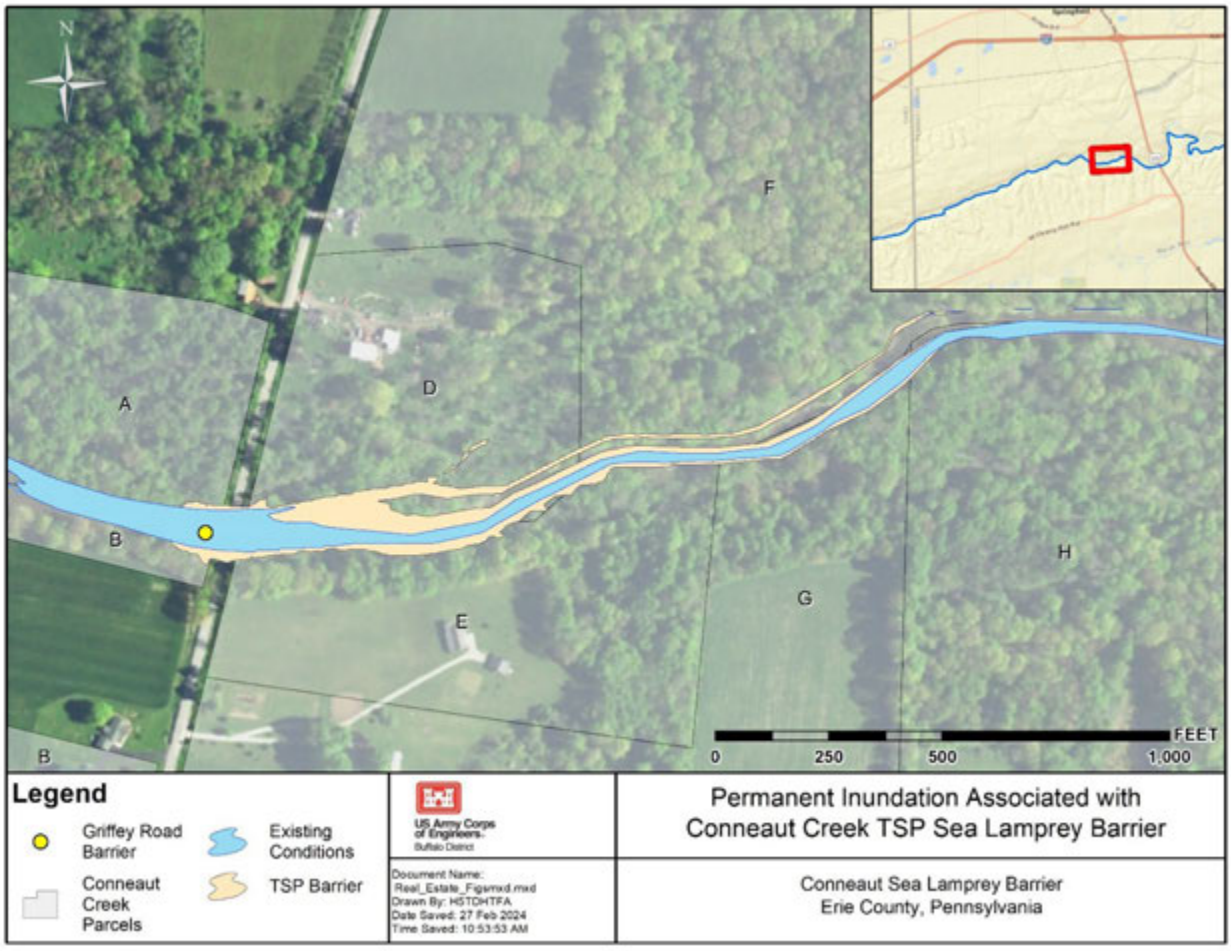


Figure 52. Existing Conditions and TSP Barrier Permenant Inundation on Upstream Parcels

Table 14. Existing Inundation Area and Elevation (ft NAVD88) Compared to TSP Per Impacted Landowner

Parcel	Existing Conditions		25% Exceedance +18" Barrier Height			
Owner	Inundation (Acres)	WSE (ft)	Inundation (Acres)	WSE (ft)	Inundation Difference (Acres)	WSE Difference (ft)
A	0.11	790.12	0.14	794.09	0.03	3.97
B	0.08	790.12	0.11	794.09	0.03	3.97
D	0.19	790.18	0.90	794.09	0.71	3.91
E	0.54	790.17	1.06	794.09	0.52	3.92
F	0.15	792.28	0.47	794.09	0.32	1.81
G	0.24	792.74	0.38	794.09	0.14	1.35
H	0.16	793.72	0.18	794.08	0.02	0.36

Table 15. Percent Increase in Inundated Area from Existing Conditions to TSP Barrier

Parcel	Existing			25% Exceedance + 18"		
Owner	Area (Acres)	Inundation (Acres)	Percent Inundated (%)	Inundation (Acres)	Percent Inundated (%)	Increase (%)
A	10.10	0.11	1.10	0.14	1.35	0.25
B	129.48	0.08	0.06	0.11	0.09	0.03
D	8.97	0.19	2.12	0.90	10.00	7.88
E	11.38	0.54	4.73	1.06	9.30	4.57
F	73.49	0.15	0.20	0.47	0.64	0.44
G	85.67	0.24	0.28	0.38	0.44	0.17
H	120.73	0.16	0.13	0.18	0.15	0.02

While increases in inundation will occur with implementation of the Conneaut Creek TSP lamprey barrier, no impacts to infrastructure or structures are expected to occur. Localized increases in inundation are contained within the floodplain and do not extend downstream of the barrier. The increases in inundation on each landowner upstream of the barrier as a result of implementation were identified. Mitigation of upstream inundation is accomplished by implementing the adjustable barrier with a lower crest height compared to other alternatives in combination with the electrical secondary barrier. These HEC-RAS results will be used to inform the takings analysis performed by Real Estate. Further modeling during the design phase of the project will be required for the final barrier design to verify the findings in this flood impact analysis.

7. Climate Change Analysis

In accordance with USACE Engineering and Construction Bulletin (ECB) 2018-14 (ECB 2018), a climate change analysis was performed for the Conneaut Creek. This guidance aims to reduce vulnerability and identify negative impacts associated with the potential for climate change effects within the project

area. The Conneaut Creek watershed is part of the larger HUC-8 watershed 04120101 – "Chautauqua-Conneaut" and the even larger HUC-4 watershed 0412 – "Lake Erie" (Figure 53). For assessing regional trends within the US, the Conneaut Creek watershed can be considered within the Northeast. Even though the terminus of Conneaut Creek is in Ohio, which is typically considered the Midwest, most of the Conneaut Creek watershed and its headwaters are located within Pennsylvania.

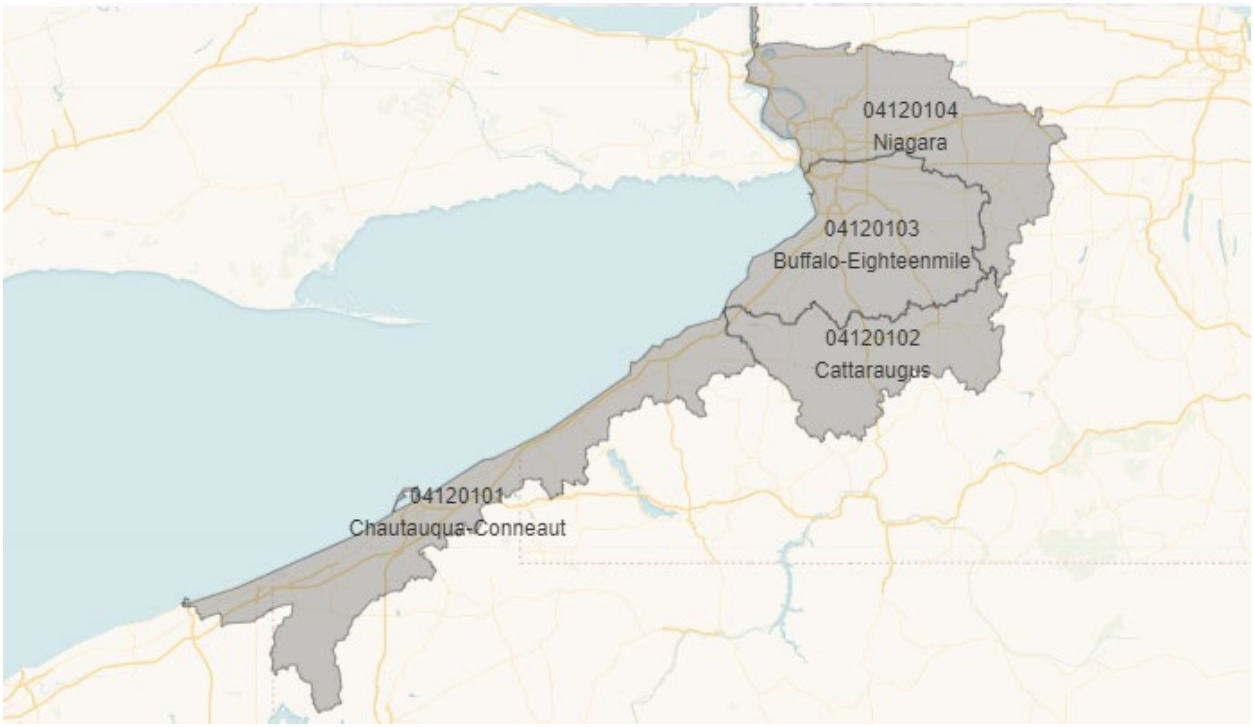


Figure 53. HUC-8 watershed 04120101 "Chautauqua-Conneaut" located in HUC-4 watershed 0412 "Lake Erie". Watersheds are within USACE Great Lakes and Ohio River Division - Buffalo District (LRB).

7.1 Literature Review of Past and Projected Climate Change

Historic climate data can determine if changes in climate have already occurred within the period of record. The Fourth National Climate Assessment (NCA4), USACE Civil Works Technical Report CWTS-2015-07, and state and watershed specific resources published by the National Oceanic and Atmospheric Administration National Centers for Environmental Information are the basis for this literature review. As shown in in Figure 54, precipitation within the US on average has increased 4 percent from 1901 – 2015 ((McRoberts and Niellson-Gammon, 2011, Peterson et al 2013)). While regional variations are prevalent, the Northeast and the Conneaut Creek watershed has experienced as much as 5 to 15 percent increases from past (1901-1960) to present (1986-2015) (Easterling et al, 2017). Increases in precipitation are largely seen from summer and fall precipitation increase within the Northeast.

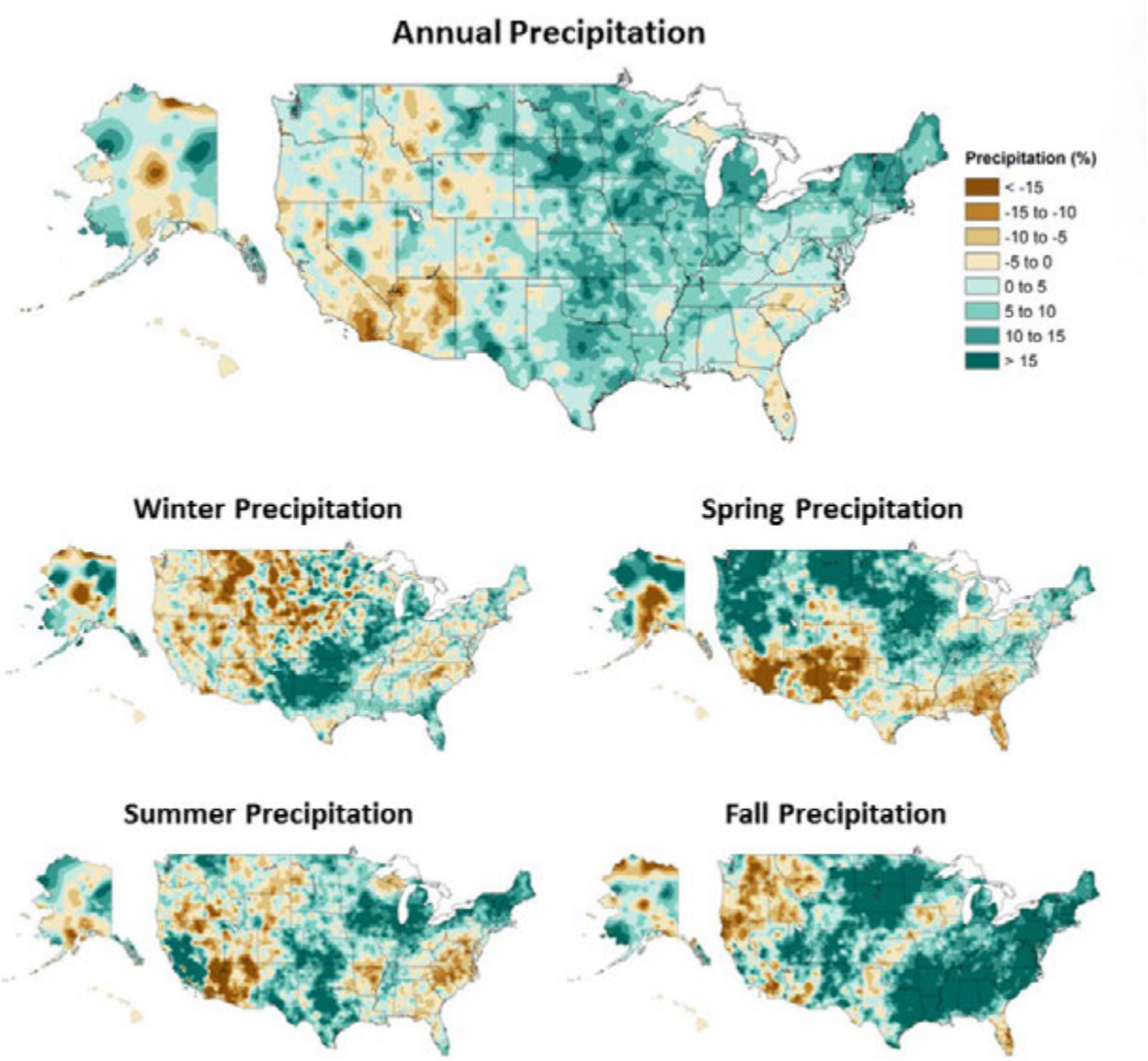


Figure 54. Percent change in annual and seasonal precipitation in the US from 1901-1960 to 1958-2015. Precipitation has increased in the Northeast annually, and particularly in the summer and fall. Source: Top - adapted from Peterson et al. 2013, © American Meteorological Society, Bottom four panels: NOAA NCEI.

Pennsylvania precipitation data shows not only above average precipitation in the latter half of the 20th century to present, but also a notable increase in extreme precipitation events (Frankson et al. 2022). Figure 55 shows most of the annual precipitation values from 1970 to 2020 were above average for the full period of record. Figure 56 shows the number of days with greater than 2 inches of precipitation has increased. Similarly, Figure 57 shows the percent change in maximum daily precipitation from 1901-2016 (38 percent) and the percent change in days that exceeded the 99th of all non-zero precipitation days from 1958-2016 (55 percent).

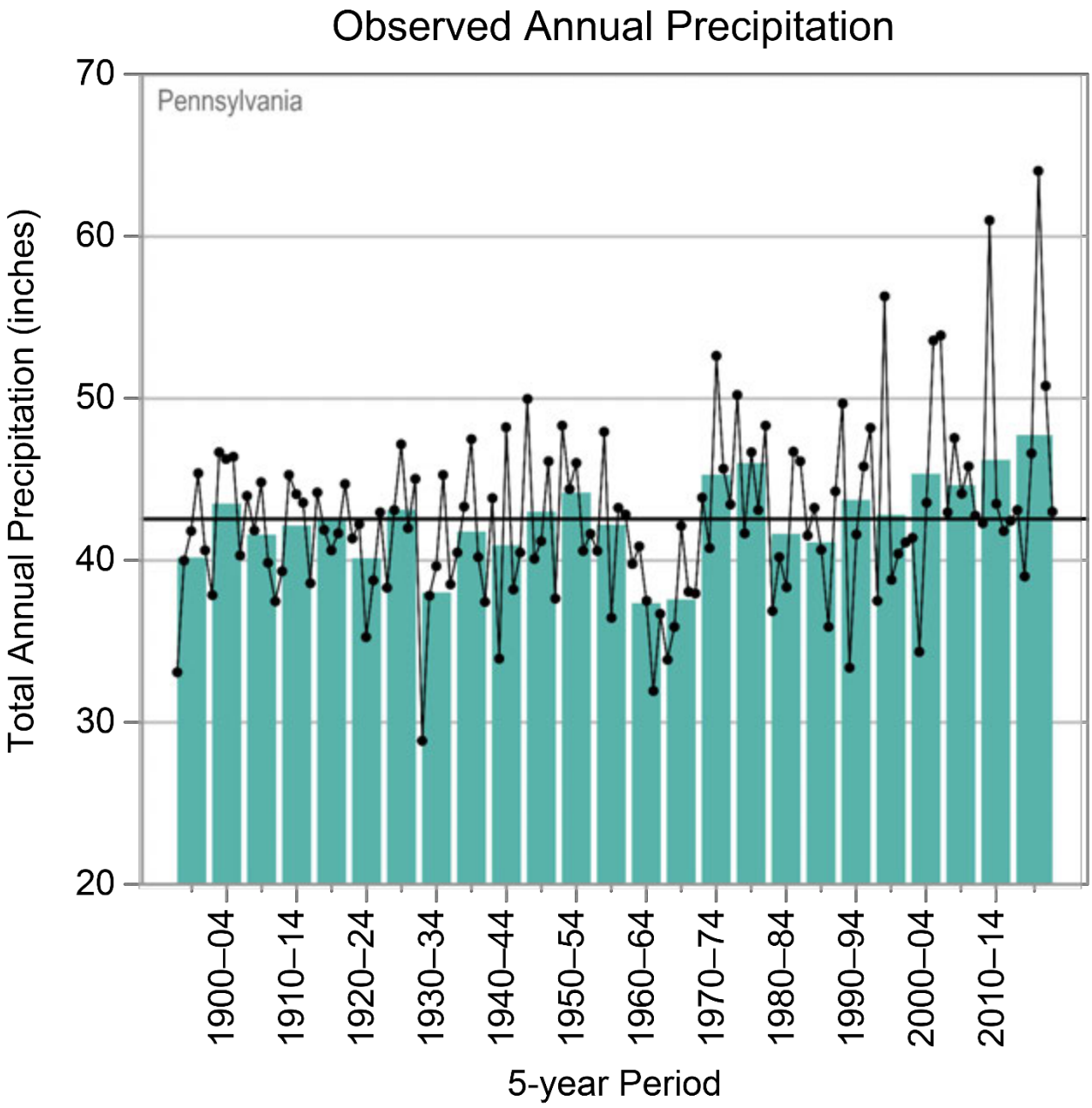


Figure 55. Observed total annual precipitation for Pennsylvania from 1900-2020. Black line = the average for the period of record, black dots = yearly value, green bars = 4-year averages. Source: CICS-NC/NOAA NCEI

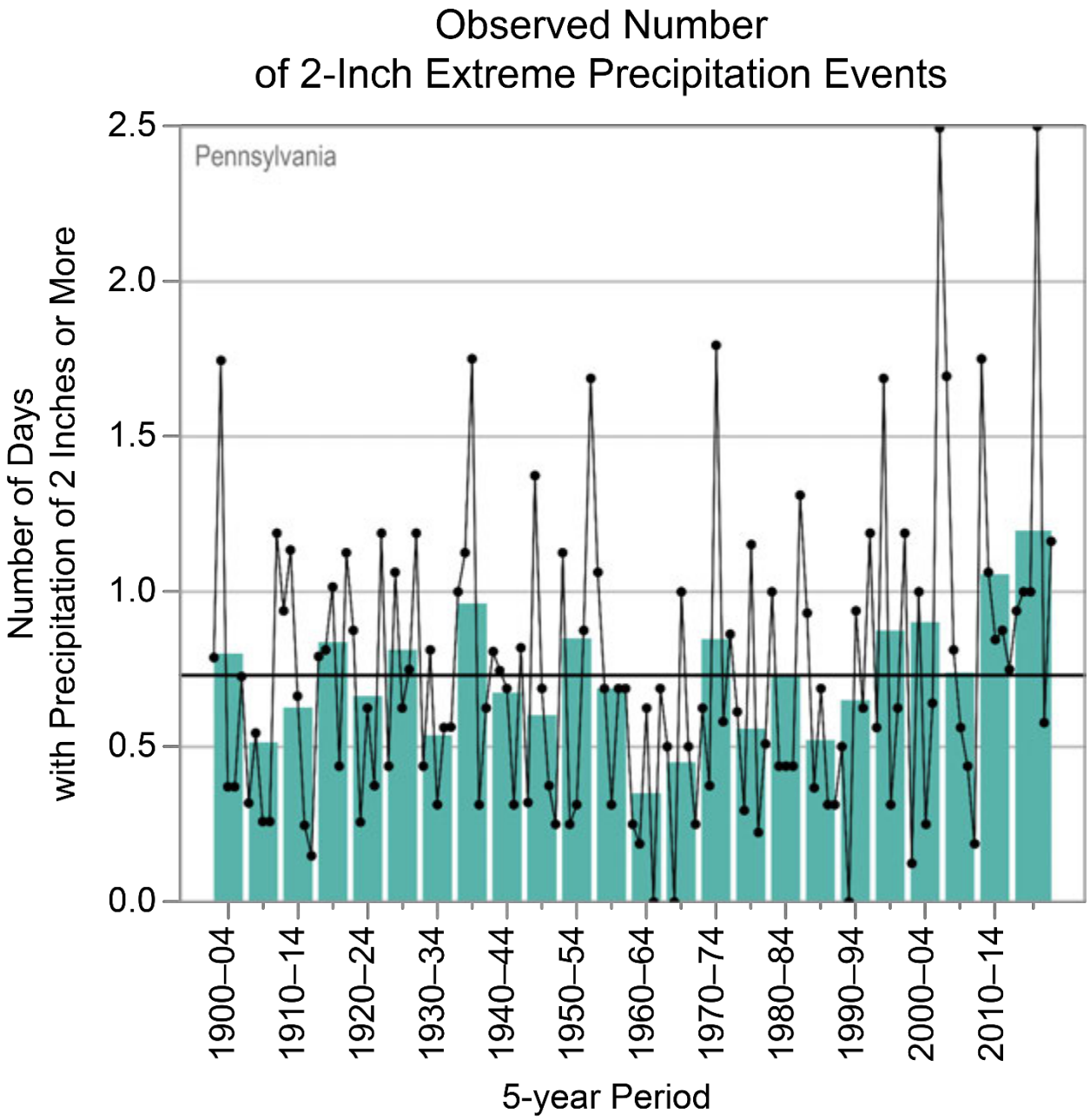


Figure 56. Observed annual number of 2-inch extreme precipitation events (days with precipitation of 2 inches or more) for Pennsylvania from 1900-2020. Black line = the average for the period of record, black dots = yearly value, green bars = 4-year averages. Source: CICS-NC/NOAA NCEI

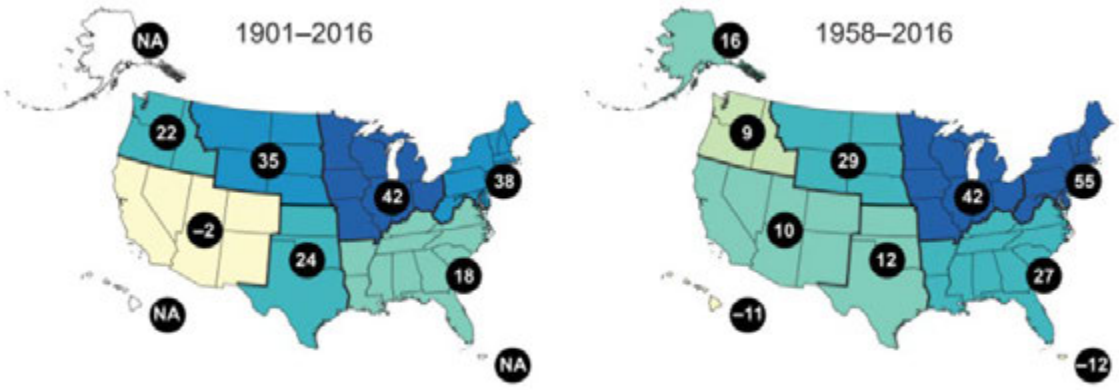


Figure 57. Left – Percent change in maximum daily precipitation taken in 5-year blocks from 1901 to 2016. Right – Percent change in the amount of daily precipitation that exceeded the 99th percentile of all non-zero precipitation days from 1958-2016. Source: CICS-NC and NOAA NCEI

Like precipitation, average temperatures in the US have increased over 1 degree Fahrenheit since the beginning of the 20th century (Vose et al. 2014). Figure 58 shows changes in temperature from 1901-1960 to 1986 to 2016 in the Northeast have increased 1.43 degrees Fahrenheit, with the largest increase coming from winter months. Increases in the coldest temperature of the year and the length of the frost-free season within the Northeast support this trend in rising winter temperatures. Pennsylvania data for annual temperature shows a nearly 2-degree Fahrenheit increases from 1901 to 1920 (Frankson et al. 2022). Figure 59 illustrates this increase and the projected modeled temperature under 2 emissions scenarios.

The projected temperature increase from the historical average for Pennsylvania is in the range of 2.5 to 15 degrees Fahrenheit by 2100, depending on future emissions scenarios (Figure 59). Statistically significant increases in temperature nationwide are also projected (Figure 60). By the latter half of the 21st century, increases in average annual temperatures in the northeast are project to have increased by 5.3 degrees Fahrenheit and 9.1 degrees Fahrenheit under low (RCP4.5) and high (RCP8.5) climate models from temperatures in the late 20th century (Sun et al. 2015).

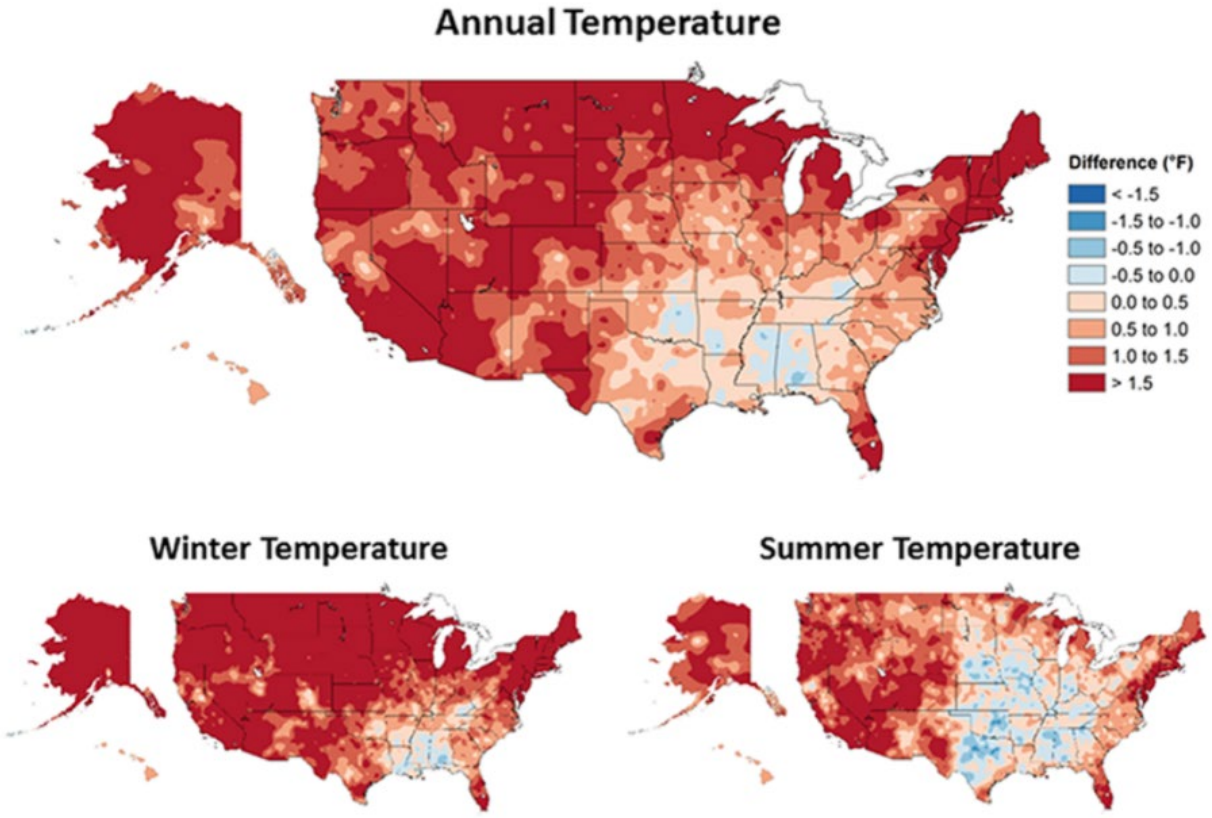


Figure 58. Observed annual, winter, and summer temperature differences between the average temperature for the periods 1901-1960 and 1986-2015. The Northeast is projected to see increases year-round, but notably increased temperatures in the winter. Source: NOAA NCDC / NCEI

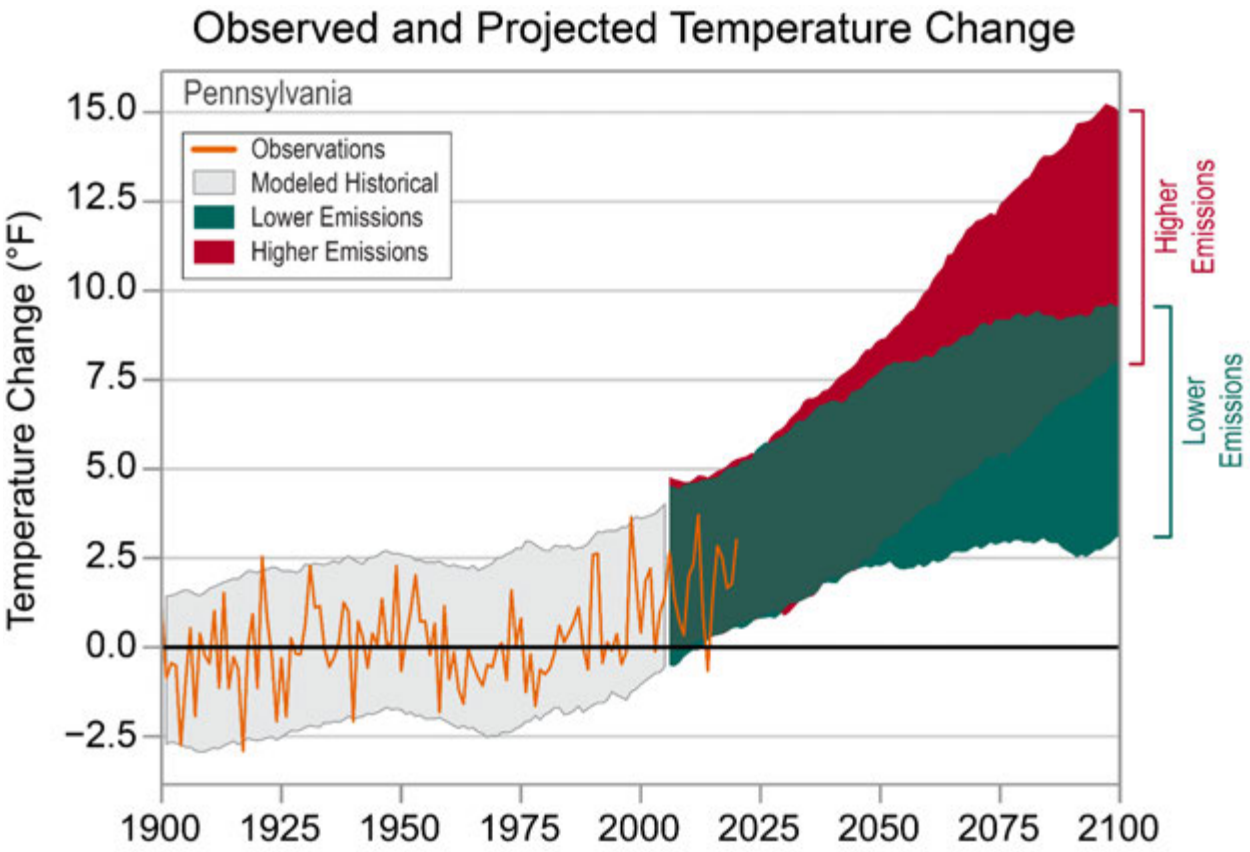


Figure 59. Pennsylvania observed temperature change (orange line) and projected increase under high and low climate scenarios. Source: CICS-NC/NOAA NCEI

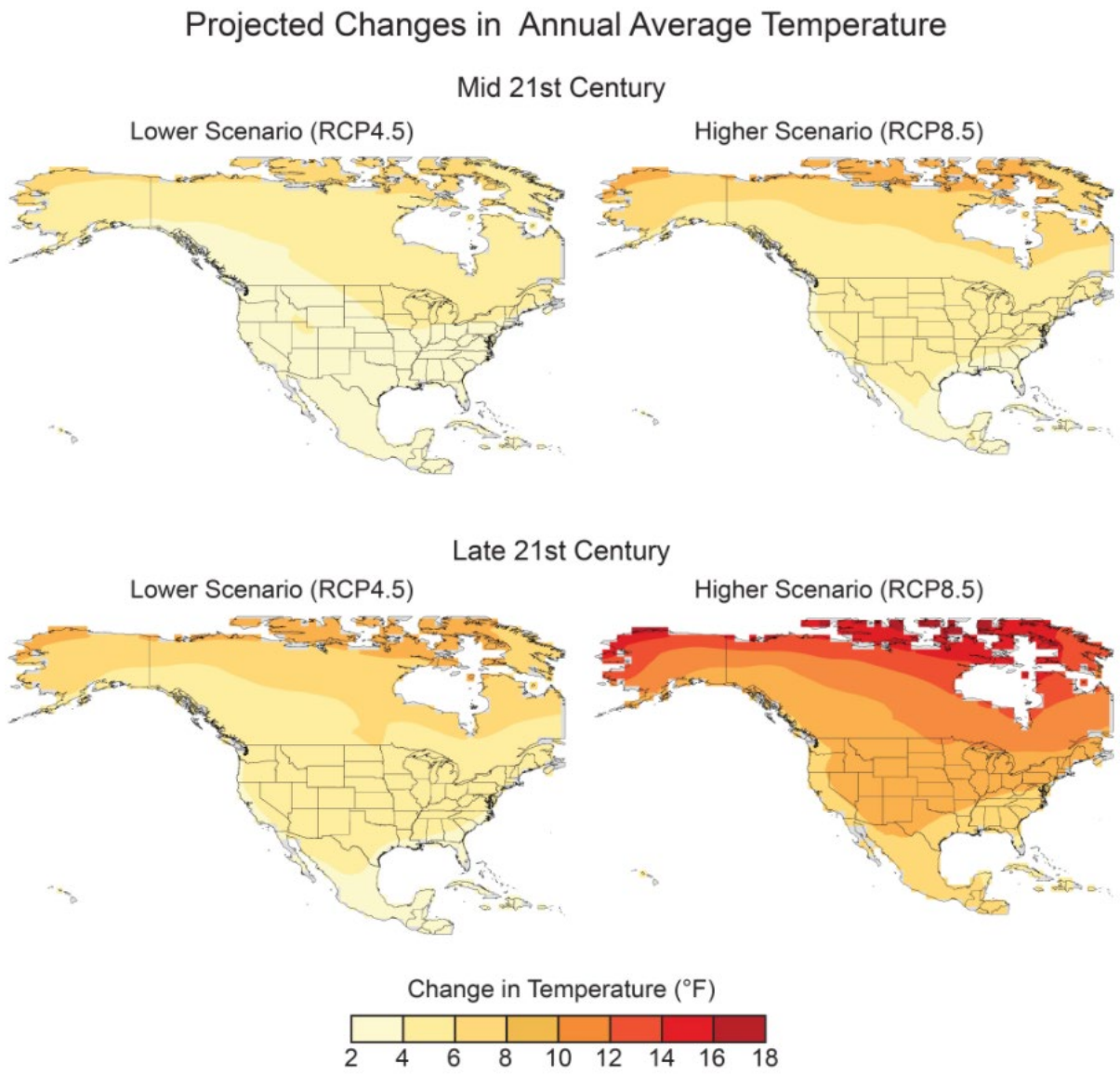


Figure 60. Projected changes in average annual temperature for the mid and late 21st century relative to the late 20th century under lower and higher modeled climate scenarios. Modeling shows a statistically significant increase in annual average temperatures for the Northeast for both scenarios. Source: CICS-NC and NOAA NCEI

Future precipitation and magnitude of storm events are expected to continue the same increased trend as historical data. Figure 61 shows the projected change in seasonal precipitation in the Northeast for the latter 21st century relative to the seasonal averages from 1976-2005, under the higher climate scenario. Increases in the winter and spring precipitation are particularly evident (denoted by the red stippling), while summer and fall seasonal precipitation shows little to no change compared to natural variation (Thibeault and Seth 2014, Lynch and Thibeault 2016). Figure 62 shows the projected 2 day, 5-year rainfall representing extreme frequency events through the end of the 21st century (Janssen et al. 2014). Along with increased precipitation, the magnitude of high frequency events is projected to increase in the Northeast under higher and lower climate scenarios. Increased temperatures and spring precipitation could be a contributing factor to this trend, as earlier snowmelt with significant rainfall events can cause high frequency floods.

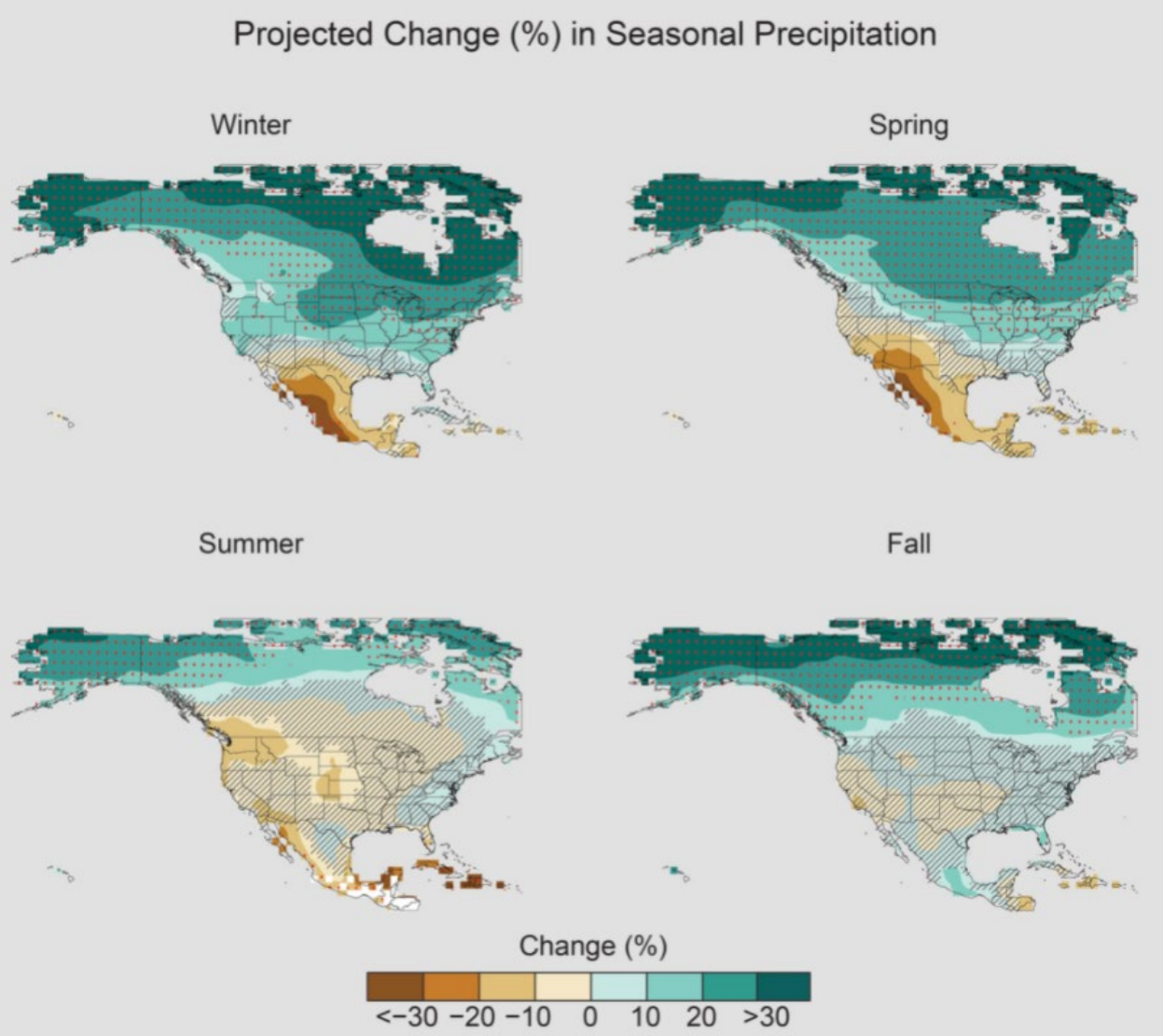


Figure 61. Climate model projections of changes (%) in annual precipitation for the middle of the 21st century compared to the late 20th century under a higher emissions pathway. Precipitation is projected to increase throughout Northeast in the winter and spring (stippling indicates significant change relative to natural variability), however, little or no change for the summer and fall seasons is observed (hatching indicates changes are small relative to the natural variability in this region). Source: CICS-NC, NOAA NCEI, and NEMAC.

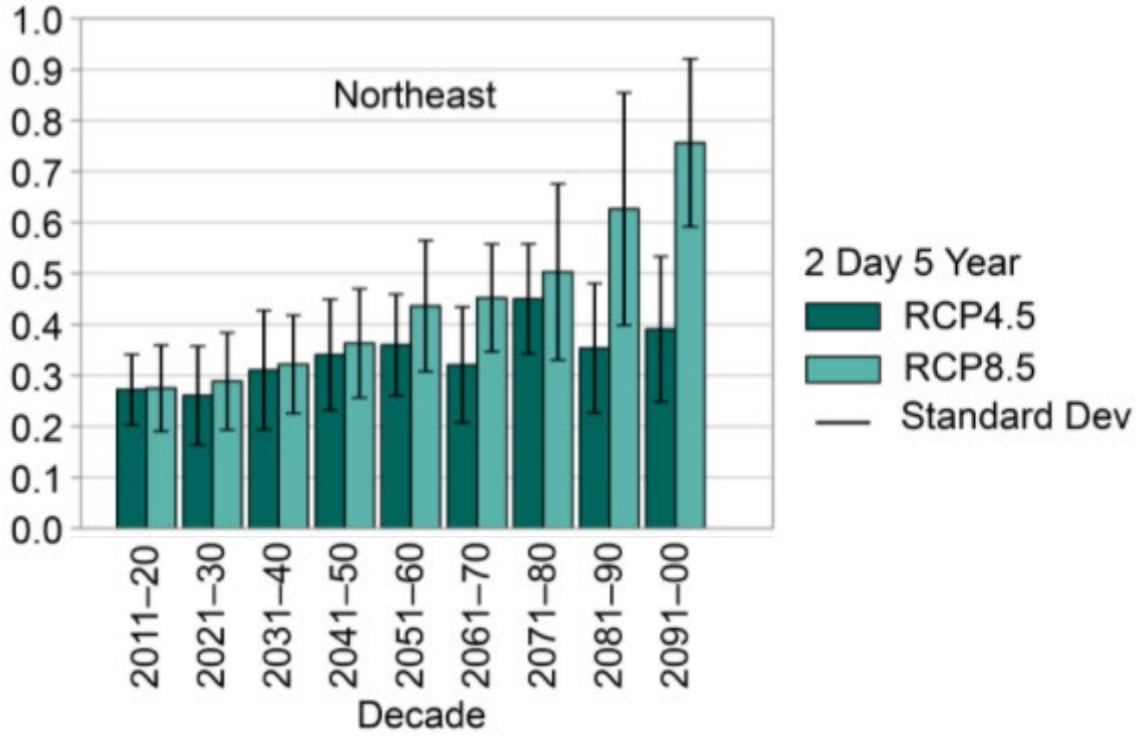


Figure 62. Projected increases in extreme event frequency (2-day 5-year event) through 2100 under higher and lower climate scenarios. An increasing trend is prevalent for the Northeast. Source: Janssen et al. 2014

In summary, both annual precipitation and average annual temperatures have increased in the northeast since the early 20th century. These trends are projected to continue through the late 21st century according to several climate models. Increased temperatures, precipitation, and magnitude and frequency of storm events are projected to increase throughout the Northeast and the Conneaut Creek watershed in the future.

7.2 First-order Statistical Analysis: Modeled Regional Streamflow Trends

The USACE Climate Hydrology Assessment Tool (CHAT) was used to investigate simulated historical and projected future trends in streamflow for HUC 04120101, the Chautauqua-Conneaut watershed (Figure 53). The CHAT tool uses the maximum monthly averaged flow for the HUC-8 watershed as the maximum flow for that water year (monthly average flows are taken by averaging daily flows). The tool models a range and mean of the annual maximum monthly streamflow's from 64 difference climate changed hydrology models.

Figure 63 shows modeled historic and projected range and average of streamflow within the Chautauqua-Conneaut watershed for the period of 1950 - 2099. The range of annual maximum monthly streamflow has relatively tight spread for modeled historic and projected observations. The overall trend in the simulated mean projected annual maximum monthly streamflow is shown in Figure 64. The simulated historical streamflow shows no statistically significant trend, while the projected future streamflow shows a decreasing trend that is statistically significant (R2 = 0.09; P-value = 0.00097 for the Mann-Kendall test and 0.00073 for Spearman Rank-Order Test). The p-value is for the linear regression fit drawn; a smaller p-value would indicate greater statistical significance. There is no recommended threshold for statistical significance, but typically 0.05 is used as this is associated with a 5% risk of a

Type I error or a false positive. This finding suggests that there is potential for average maximum monthly flows to decrease in the future for the study area, relative to the current conditions.

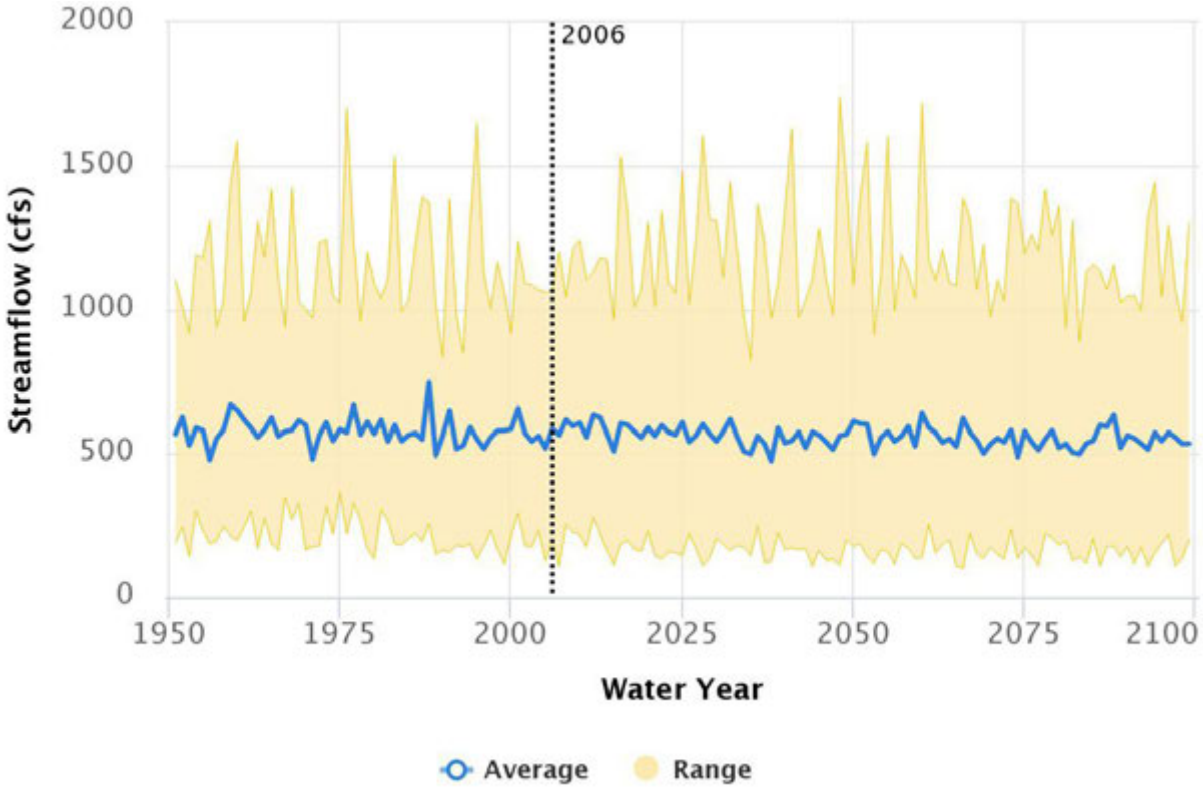


Figure 63. Range and average of modeled historic and projected annual maximum monthly streamflow among 64 climate-changed hydrology models for HEC 04120101 "Chautauqua-Conneaut".

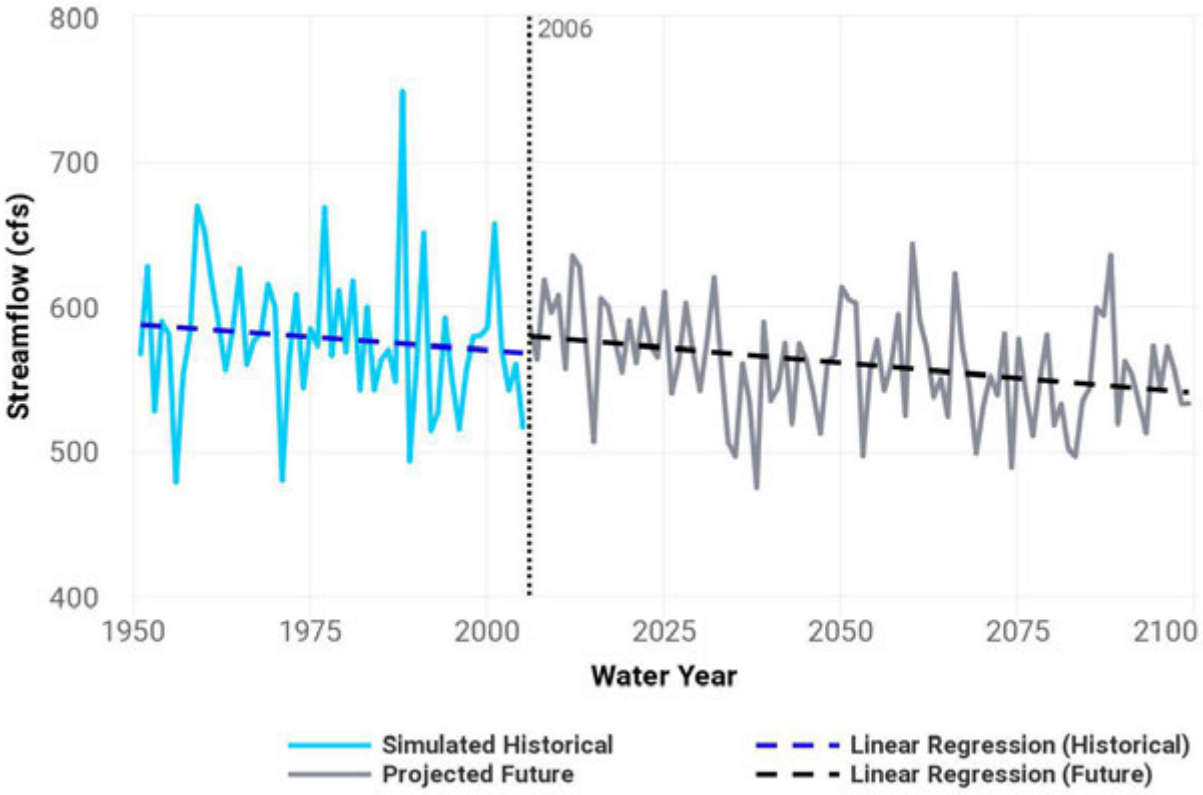


Figure 64. Linear regression of modeled mean historical and projected annual maximum monthly streamflow for HEC 04120101 "Chautauqua-Conneaut".

7.3 First-order Statistical Analysis: Site Specific Trends and Non-Stationarity Detection

The USACE Nonstationarity Detection Tool (NSD) applies "a series of statistical tests to assess the stationarity of annual instantaneous peak streamflow data series" (Friedman et al., 2016). That is, the NSD determines if any significant abrupt or smooth changes in the mean, standard deviation/variance, and/or distribution for the peak annual streamflow data occur for the period of analysis. A total of twelve different statistical methods are utilized by the NSD tool. Detection of nonstationarites helps to select a homogenous dataset that can be further used for hydrologic analysis.

Typically, a "strong" nonstationarity is required to divide the dataset into separate homogenous groups. This requires the nonstationary to meet 3 criteria: consensus (detected by two or more detection methods of the same kind – mean, std. dev./variance, or distribution), robustness (detected by multiple statistical tests during the same year), and a large difference or magnitude in the mean, standard deviation, or variance.

Annual peak discharge data from USGS 04213000 Conneaut Creek at Conneaut OH was used to assess nonstationarity within flow record. The gage is the only gage on Conneaut Creek and has a similar drainage are to the project location. The gage has an 85-year period of record from 1923-2020, with a gap in the record from 1936-1950. Applying the NSD tool to the Conneaut Creek at Conneaut OH for the whole period of record resulted in a nonstationarity in the distribution (Energy Divisive Method) in 1987 and a nonstationarity in the variance (Lombard Mood) in 1995 (Figure 65). However, these

nonstationarities can be considered statistically insignificant since they are lacking consensus (Figure 65), robustness (Figure 66) and magnitude (Figure 67).

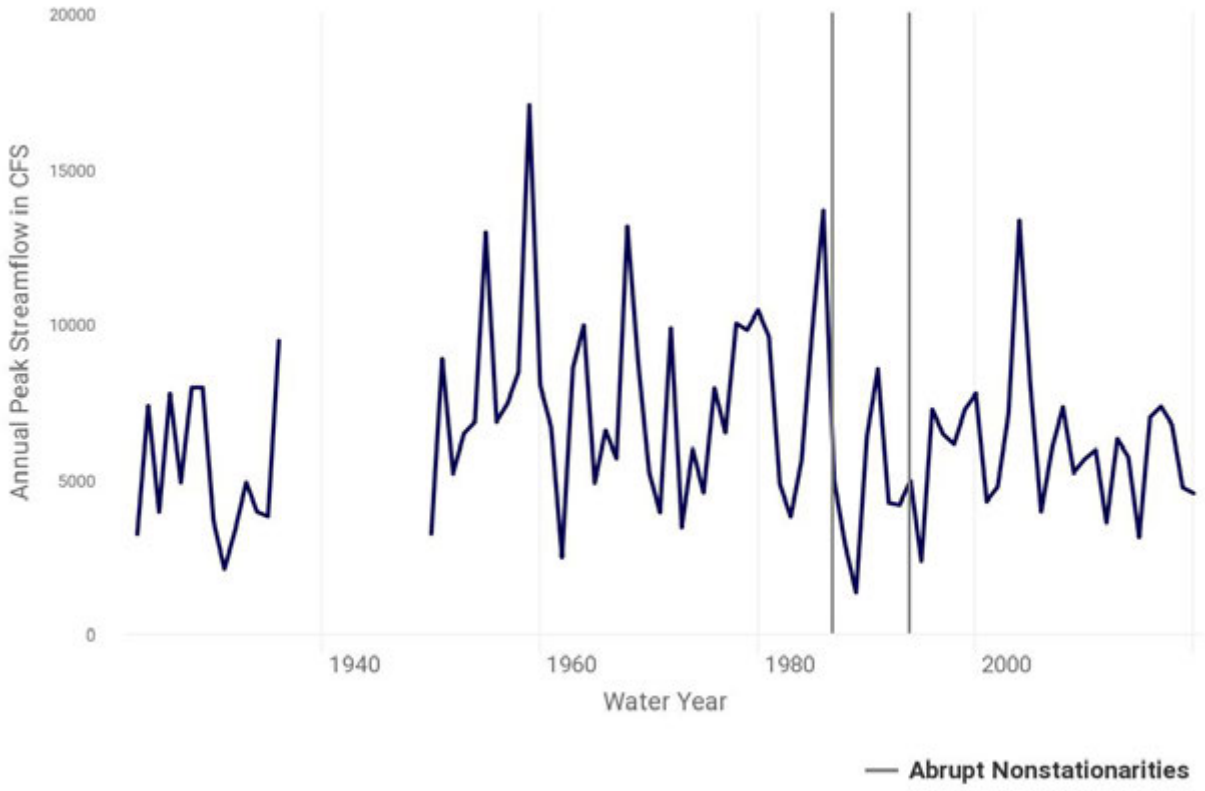


Figure 65. NSD Tool results for USGS gage Conneaut Creek at Conneaut OH from 1923-2020. Abrupt Nonstationarities detected in 1987 and 1995.

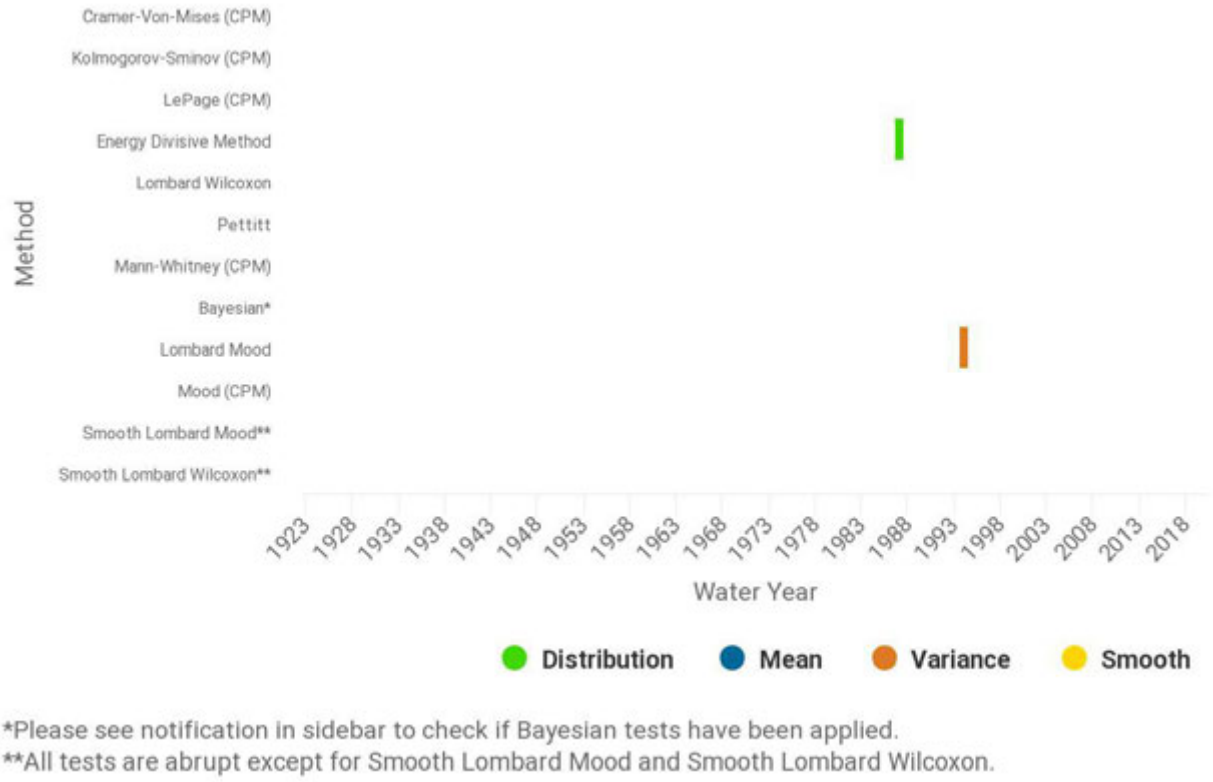


Figure 66. NSD Tool Heat Map for USGS gage Conneaut Creek at Conneaut OH from 1923-2020. Nonstationarities in Distribution (Energy Divisive Method 1987) and Variance (Lombard Mood 1995) detected.

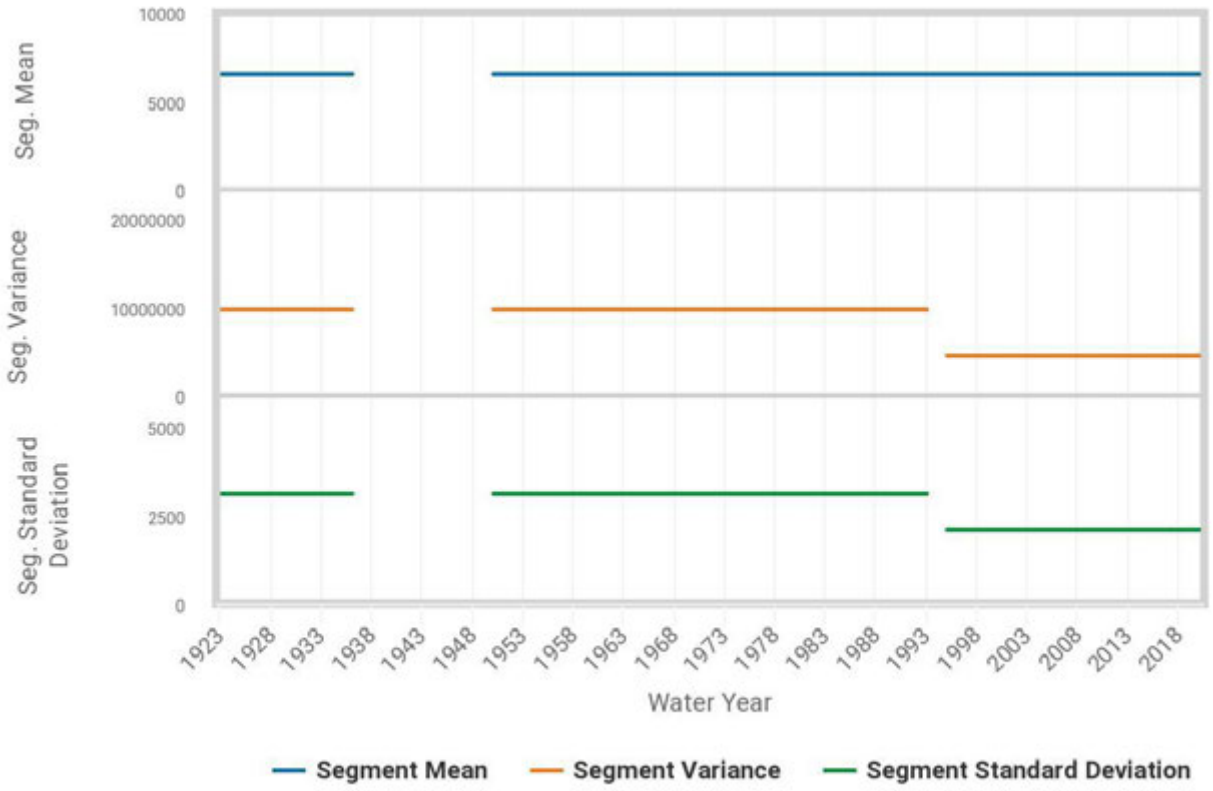


Figure 67. NSD Tool Segment Statistics for USGS gage Conneaut Creek at Conneaut OH from 1923-2020.

Since a large data gap existed within the period of record, the NSD tool was used for a truncated period of record for the gage from 1950-2020. This detected nonstationarities in the mean (Lombard Wilcoxon) in 1984, in the distribution (Energy Divisive Method) in 1987, and in the variance (Lombard Mood) in 1994 (Figure 68). The two nonstationarities detected in 1984 and 1987 can are likely related as they are within 5-years of each other. In that case, these nonstationarities exhibit some degree of robustness as both mean and distribution tests are detected (Figure 69). This robustness along with the change in mean observed around 1985 (Figure 70) indicate that a change point may be observed around 1985. However, due to the lack of consensus (Figure 68), the nonstationarity was not considered to be a strong change point within the period of record. Using the period of record from 1950-2020, rather than further truncating the record at 1985 was also determined to be a more conservative approach in terms of calculating flow frequencies and designing barrier measures, as several peak storm events prior to 1985 are greater than those observed in the following period. That is, using the longer POR will result in a larger flow value for the 10% ACE flow that the barrier is designed to, thus providing a more conservative level of protection against sea lamprey.

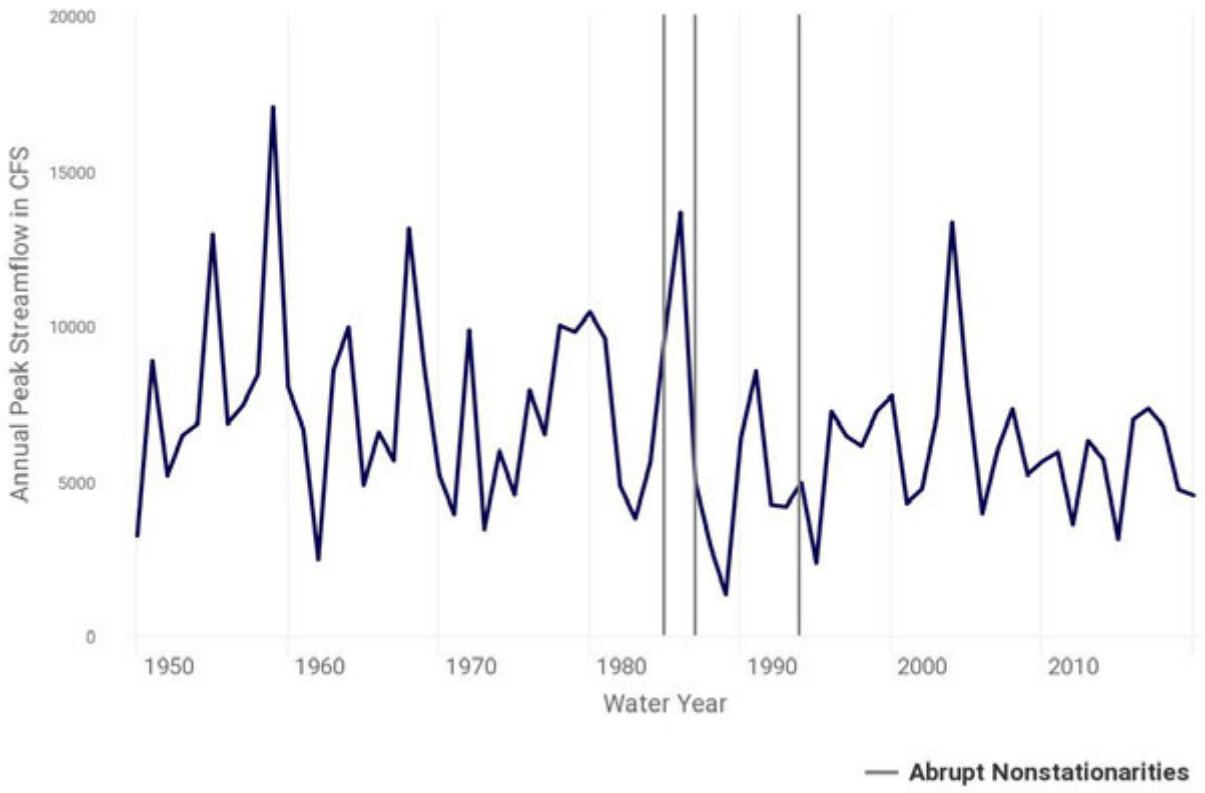


Figure 68. NSD Tool results for USGS gage Conneaut Creek at Conneaut OH from 1950-2020. Abrupt Nonstationarities detected in 1984, 1987 and 1994.

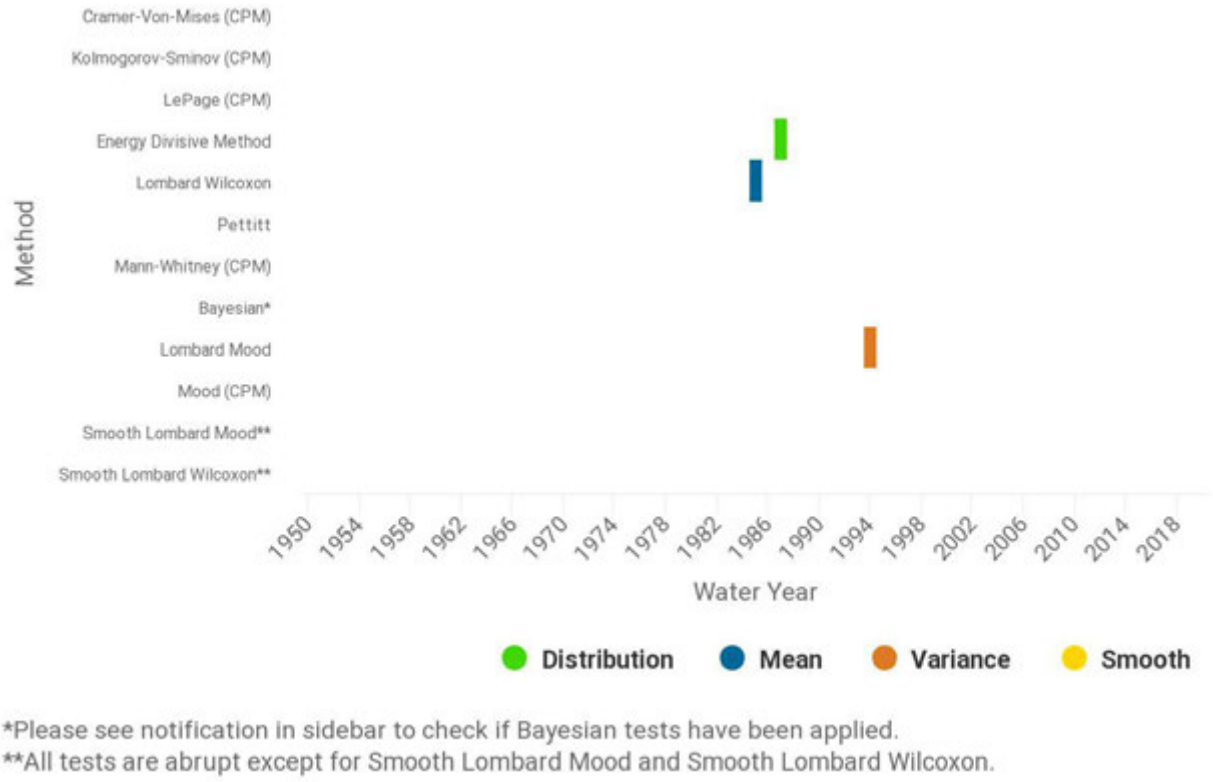


Figure 69. NSD Tool Heat Map for USGS gage Conneaut Creek at Conneaut OH from 1950-2020. Nonstationarities in Mean (Lombard Wilcoxon 1984), Distribution (Energy Divisive Method 1987) and Variance (Lombard Mood 1994) detected.

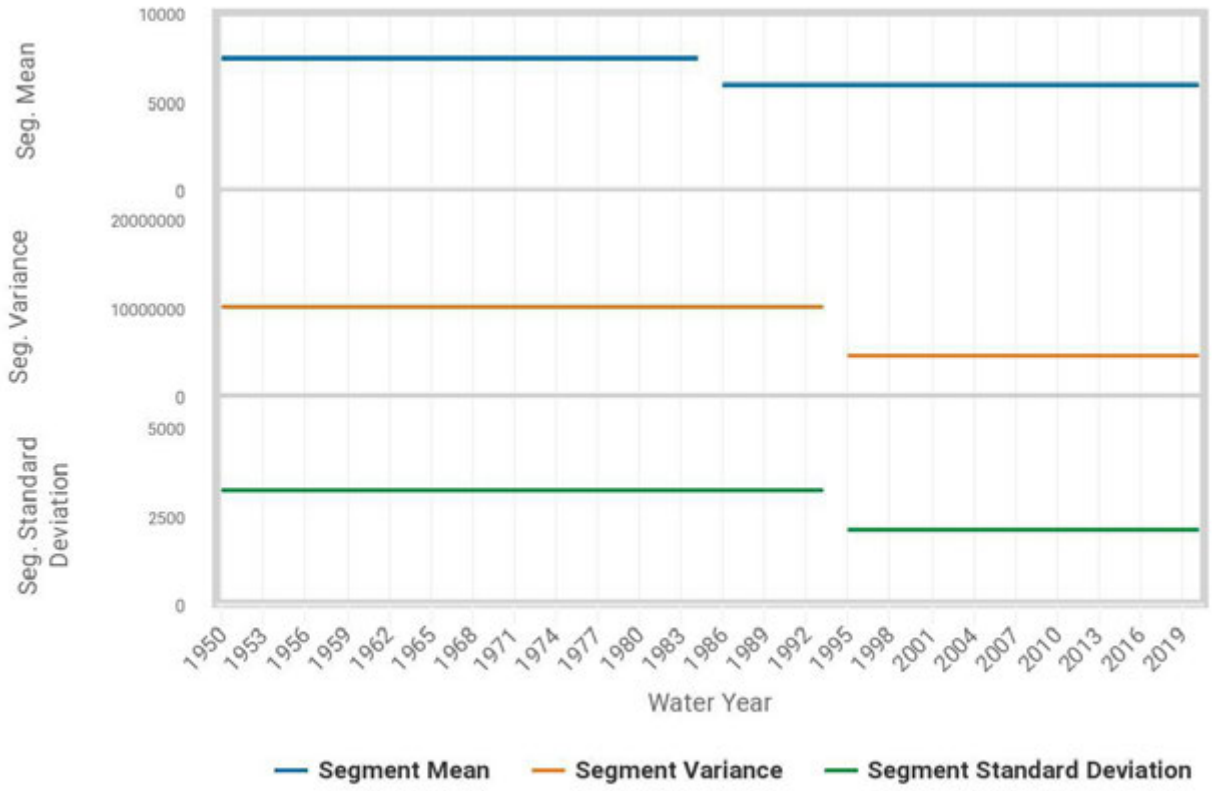
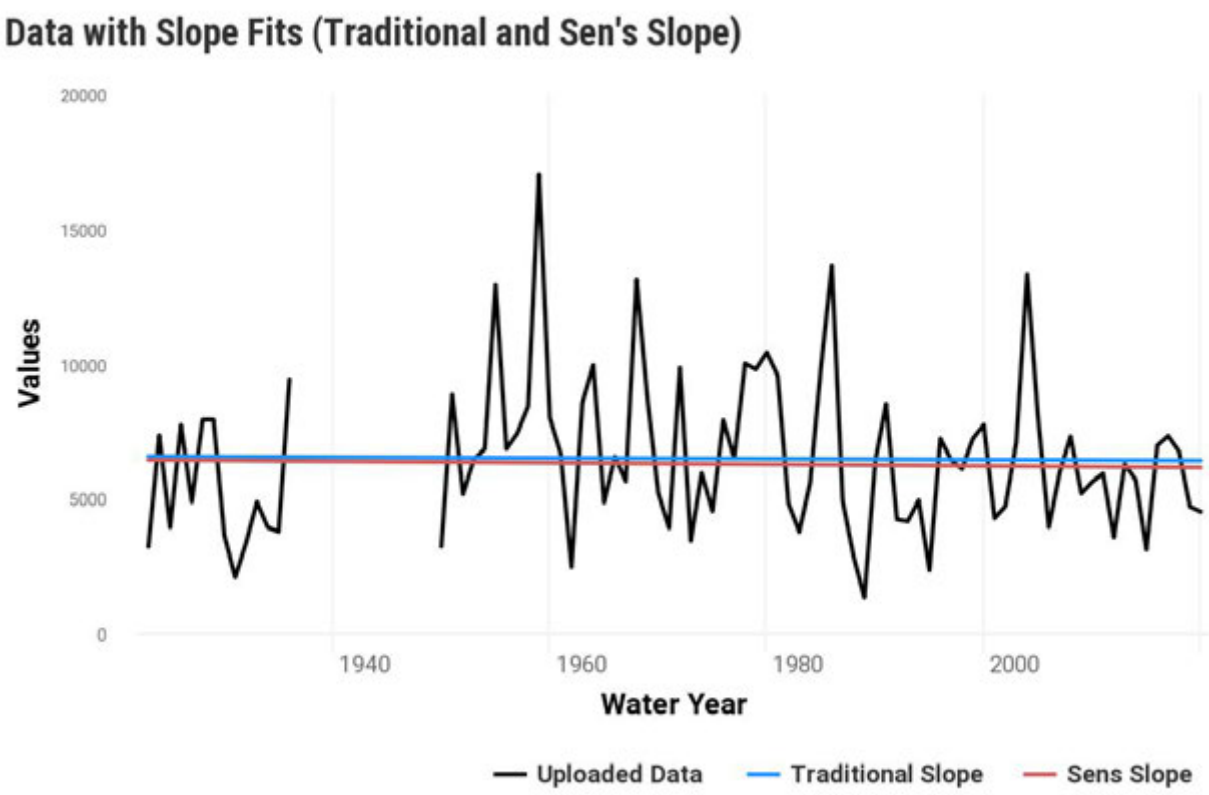


Figure 70. NSD Tool Segment Statistics for USGS gage Conneaut Creek at Conneaut OH from 1950-2020.

The NSD tool also performs a monotonic trend analysis to determine if any statistically significant trends are present within the period of analysis using the t-Test, Mann-Kendall, and Spearman Rank Order tests. When applied to the full period of record, all three tests determine no statistically significant trends existed within the dataset (Figure 71). However, the truncated period of record excluding the data gap (1950-2020) was also analyzed. This resulted in statistically significant downward trend in annual peak flows at the 0.05 level of significance (t-Test $p = 0.037$; Spearman Rank Order Test $p = 0.045$, Figure 72).

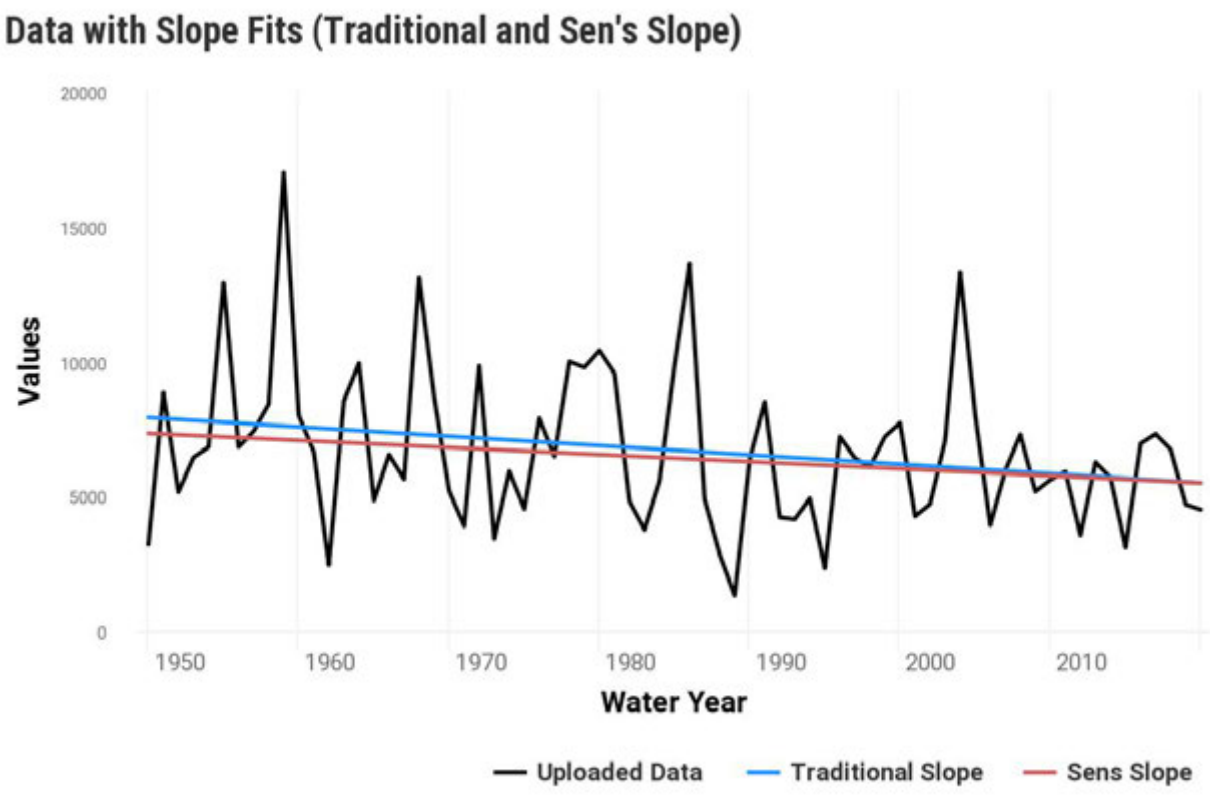


Trend Hypothesis Test

Test	P-Value
t-Test	0.88507
Mann-Kendall	0.76139
Spearman Rank-Order	0.702

- **A statistically significant trend (at the alpha = .05 level) was NOT detected by the t-Test.**
- **A statistically significant trend (at the alpha = .05 level) was NOT detected by the Mann-Kendall Test.**
- **A statistically significant trend (at the alpha = .05 level) was NOT detected by the Spearman Rank-Order Test.**

Figure 71. Trend Analysis for USGS gage Conneaut Creek at Conneaut OH from 1923-2020. No statistically significant trends identified.



Trend Hypothesis Test

Test	P-Value
t-Test	0.038647
Mann-Kendall	0.061989
Spearman Rank-Order	0.044915

- **A statistically significant trend (at the alpha = .05 level) was detected by the t-Test.**
- **A statistically significant trend (at the alpha = .05 level) was NOT detected by the Mann-Kendall Test.**
- **A statistically significant trend (at the alpha = .05 level) was detected by the Spearman Rank-Order Test.**

Figure 72. Trend Analysis for USGS gage Conneaut Creek at Conneaut OH from 1950-2020. A statistically significant downward trend identified by t-Test and Spearman Rank-Order Test.

7.4 Screening-Level Climate Change Vulnerability Assessment (VA) Tool

The USACE Climate Change Vulnerability Assessment (VA) Tool is a screening-level tool to assess and compare climate change vulnerabilities in select HUC-4 watersheds relative to all other HUC-4 watersheds in the US. The tool assesses vulnerabilities in select USACE business lines such as Flood Risk Reduction, Water Supply, Navigation, Regulatory, etc. The VA tool is being used on HUC 0412 "Lake Erie" to assess vulnerability to climate change in the business lines of Ecosystem Restoration, Flood Risk Reduction, and Recreation. These three business lines are relevant to GLFER and the goals of the Conneaut Creek Lamprey Barrier project.

The tool uses the WOWA method to represent a composite index of how vulnerable a given HUC 04 watershed (Vulnerability Score) is to climate change specific to a given business line. WOWA stands for "Weighted Ordered Weighted Average," which reflects the aggregation approach used to get the final score for each HUC. After normalization and standardization of indicator data, the data are weighted with "importance weights" determined by the Corps (the first "W"). Then, for each HUC-epoch-scenario, all indicators in a business line are ranked according to their weighted score, and a second set of weights (which are the "OWA" weights, are applied, based on the specified ORness level. This yields a single aggregate score for each HUC-epoch-scenario called the WOWA score. WOWA contributions/indicator contributions are calculated after the aggregation to give a sense of which indicators dominate the WOWA score at each HUC.

WOWA scores in each business line are determined for 2, 30-year epochs for both wet and dry scenarios by the VA tool. The wet and dry scenarios are based on projected runoff above and below the median runoff, respectively. The percent change in WOWA scores between the epochs is also determined. Each business line's WOWA score is dependent of a set of indicators relevant to that business line. The indicators for the Ecosystem Restoration business line are: change in sediment load, monthly CV of runoff, percent change in runoff divided by percent change in precipitation, macroinvertebrate index of biotic condition, flood magnification factor (local), flood magnification factor (cumulative), mean annual runoff, low flow reduction factor, and percent of freshwater plant communities at risk.

The indicators for Flood Risk Reduction are: annual CV of unregulated runoff, percent change in runoff divided by percent change in precipitation, flood magnification factor (local), flood magnification factor (cumulative), and acres of urban area within the 500-year floodplain. The indicators for Recreation are: change in sediment load, monthly CV of runoff, percent change in runoff divided by percent change in precipitation, flood magnification factor (local), flood magnification factor (cumulative), monthly 90 percent exceedance flow, monthly 10 percent exceedance flow, low flow reduction factor, and drought severity index. Table 16 summarizes the indicators used in the VA Tool.

Table 16. VA Tool indicators and descriptions

Indicator Short Name	Indicator Name	Large Values = High Vulnerability	Indicator Description	Data Sources	Last Updated
8 AT RISK FRESHWATER PLANT	% of freshwater plant communities at risk	Yes	% of wetlands & riparian plant communities that are at risk of extinction, based on remaining number & condition, remaining acreage, threat severity, etc.	NatureServe - Explorer (customized dataset). Data were obtained from Jason McNees at NatureServe, 1101 Wilson Blvd., 15th Floor Arlington, VA 22201 via email on July 31, 2009	Feb-2016
65L MEAN ANNUAL RUNOFF	Mean annual runoff (local)	No	Mean runoff: average annual runoff, excluding upstream freshwater inputs (local).	Data calculated from interagency CMIP5 GCM - BCSD - VIC dataset (2014)	Sep-2014
95 DROUGHT SEVERITY	Drought Severity Index	Yes	Greatest precipitation deficit: The most negative value calculated by subtracting potential evapotranspiration from precipitation over any 1-, 3-, 6-, or 12-month period.	Data calculated from interagency CMIP5 GCM - BCSD - VIC dataset (2014)	Jul-2015
156 SEDIMENT	Change in sediment load due to change in future precipitation	Yes	The ratio of the change in the sediment load in the future to the present load.	CDM	Feb-2016
175L ANNUAL COV	Annual CV of unregulated runoff (local)	Yes	Long-term variability in hydrology: ratio of the SD of annual runoff to the annual runoff mean. Excludes upstream freshwater inputs (local).	Data calculated from interagency CMIP5 GCM - BCSD - VIC dataset (2014)	Sep-2014
221C MONTHLY COV	Monthly CV of runoff (cumulative)	Yes	Measure of short-term variability in the region's hydrology: 75th percentile of annual ratios of the SD of monthly runoff to the mean of monthly runoff. Includes upstream freshwater inputs (cumulative).	Data calculated from interagency CMIP5 GCM - BCSD - VIC dataset (2014)	Sep-2014
277 RUNOFF PRECIP	% change in runoff divided by % change in precipitation	Yes	Median of: deviation of runoff from monthly mean times average monthly runoff divided by deviation of precipitation from monthly mean times average monthly precipitation.	Data calculated from interagency CMIP5 GCM - BCSD - VIC dataset (2014) using method of Sankarasubramanian & Vogel 2001 WRR 37(6)1771-1781	Feb-2015
297 MACROINVERTEBRATE	Macroinvertebrate index of biotic condition	No	The sum (ranging from 0-100) of scores for six metrics that characterize macroinvertebrate assemblages: taxonomic richness, taxonomic composition, taxonomic diversity, feeding groups, habits, pollution tolerance.	USEPA - Wadeable Streams Assesment (WSA) (Stream Water Benthic Macroinvertebrate Metrics)	Feb-2016
568C FLOOD MAGNIFICATION	Flood magnification factor (cumulative)	Yes	Change in flood runoff: ratio of indicator 571C (monthly runoff exceeded 10% of the time, including upstream freshwater inputs) to 571C in	Data calculated from interagency CMIP5 GCM - BCSD - VIC dataset (2014)	Sep-2014
568L FLOOD MAGNIFICATION	Flood magnification factor (local)	Yes	Change in flood runoff: Ratio of indicator 571L (monthly runoff exceeded 10% of the time, excluding upstream freshwater inputs) to 571L in base period.	Data calculated from interagency CMIP5 GCM - BCSD - VIC dataset (2014)	Sep-2014
570L 90PERC EXCEEDANCE	Low flow (monthly flow exceeded 90% of time; local)	No	Low runoff: monthly runoff that is exceeded 90% of the time, excluding upstream freshwater inputs (local).	Data calculated from interagency CMIP5 GCM - BCSD - VIC dataset (2014)	Sep-2014
571C 10PERC EXCEEDANCE	Flood flow (monthly flow exceeded 10% of time; cumulative)	Yes	Flood runoff: monthly runoff that is exceeded 10% of the time, including upstream freshwater inputs (cumulative).	Data calculated from interagency CMIP5 GCM - BCSD - VIC dataset (2014)	Sep-2014
571L 10PERC EXCEEDANCE	Flood flow (monthly flow exceeded 10% of time; local)	Yes	Flood runoff: monthly runoff that is exceeded 10% of the time, excluding upstream freshwater inputs (local).	Data calculated from interagency CMIP5 GCM - BCSD - VIC dataset (2014)	Sep-2014
590 URBAN 500YRFLOODPLAIN AREA	Acres of urban area within 500-year floodplain	Yes	Acres of urban area within the 500-year floodplain.	(1) FEMA - 500 year Flood Zones (2) EPA - Integrated Climate & L& Use Scenarios (ICLUS)	Jan-2011
700C LOW FLOW REDUCTION	Low flow reduction factor (cumulative)	No	Change in low runoff: ratio of indicator 570C (monthly runoff exceeded 90% of the time, including upstream freshwater inputs) to 570C in base period.	Data calculated from interagency CMIP5 GCM - BCSD - VIC dataset (2014)	Sep-2014

Figure 73 and Figure 74 show the vulnerability scores for the Ecosystem Restoration business line for both epochs and wet/dry scenarios. The dry WOWA score for 2050 was 69.25 and for 2085 was 69.15. The percent change in WOWA score for the dry scenario was -0.15%. The wet WOWA score for 2050 and

2085 were 68.88 and 69.45, respectively. The percent change in WOWA score for the wet scenario was 0.83%.

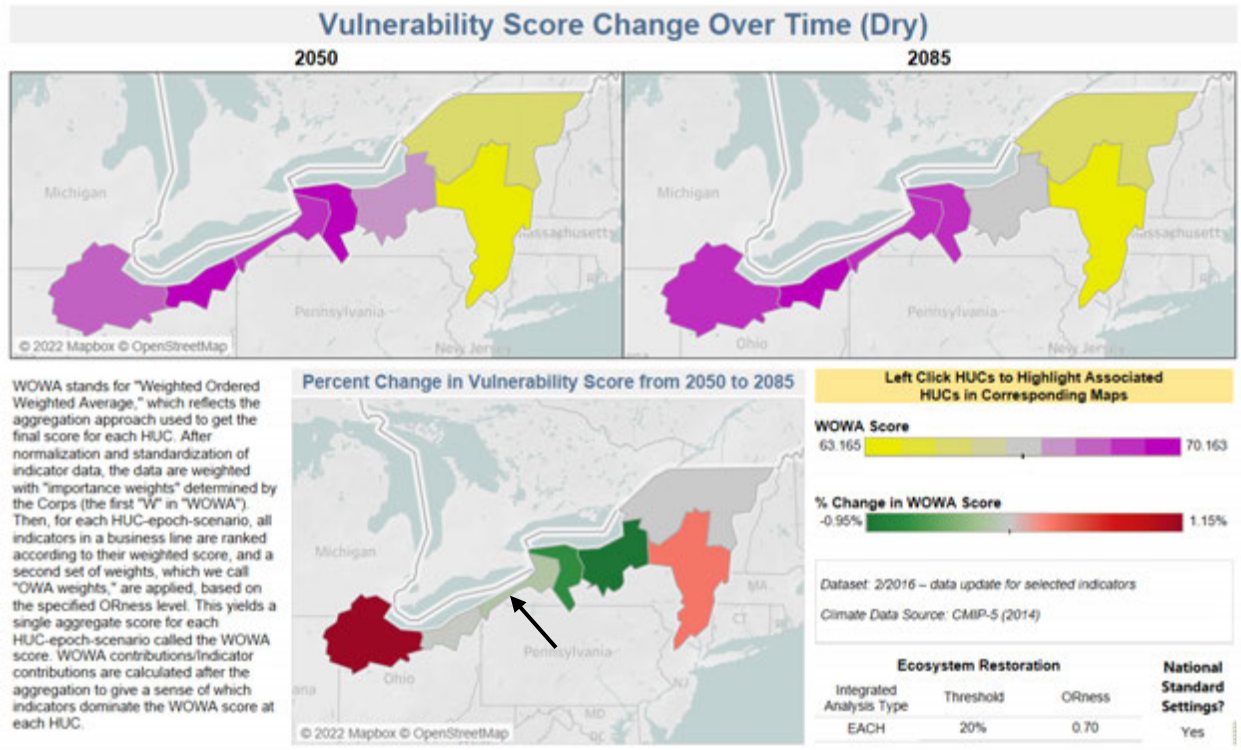


Figure 73. WOWA score and percent change in WOWA score for LRB during 2, 30-year epochs, dry scenario, for the Ecosystem Restoration business line. The Conneaut Creek watershed is within HUC 0412 "Lake Erie" (denoted with arrow).

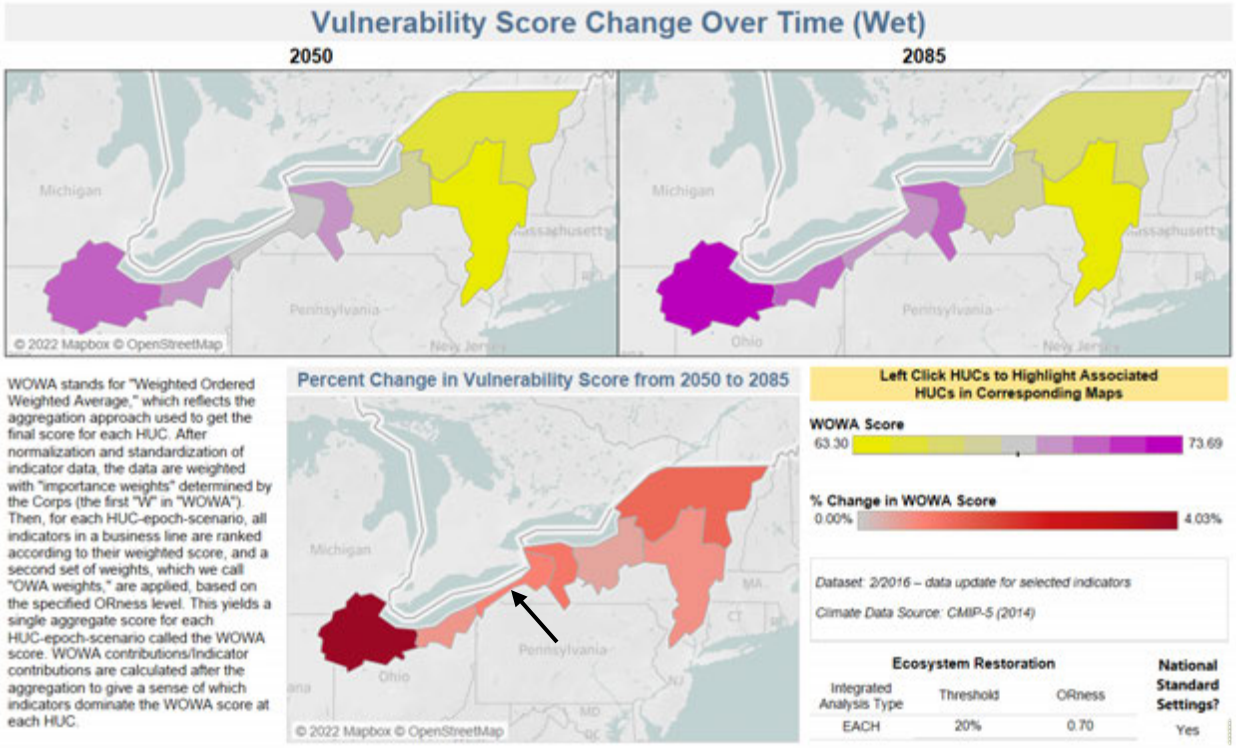


Figure 74. WOWA score and percent change in WOWA score for LRB during 2, 30-year epochs, wet scenario, for the Ecosystem Restoration business line. The Conneaut Creek watershed is within HUC 0412 "Lake Erie" (denoted with arrow).

Figure 75 and Figure 76 show the vulnerability scores for the Flood Risk Reduction business line for both epochs and wet/dry scenarios. The dry WOWA score for 2050 was 45.31 and for 2085 was 44.29. The percent change in WOWA score for the dry scenario was -2.25 %. The wet WOWA score for 2050 and 2085 were 48.29 and 49.68, respectively. The percent change in WOWA score for the wet scenario was 2.87%.

Figure 77 and Figure 78 show the vulnerability scores for the Recreation business line for both epochs and wet/dry scenarios. The dry WOWA score for 2050 was 64.67 and for 2085 was 65.36. The percent change in WOWA score for the dry scenario was 1.07%. The wet WOWA score for 2050 and 2085 were 63.16 and 64.64, respectively. The percent change in WOWA score for the wet scenario was 2.33%.

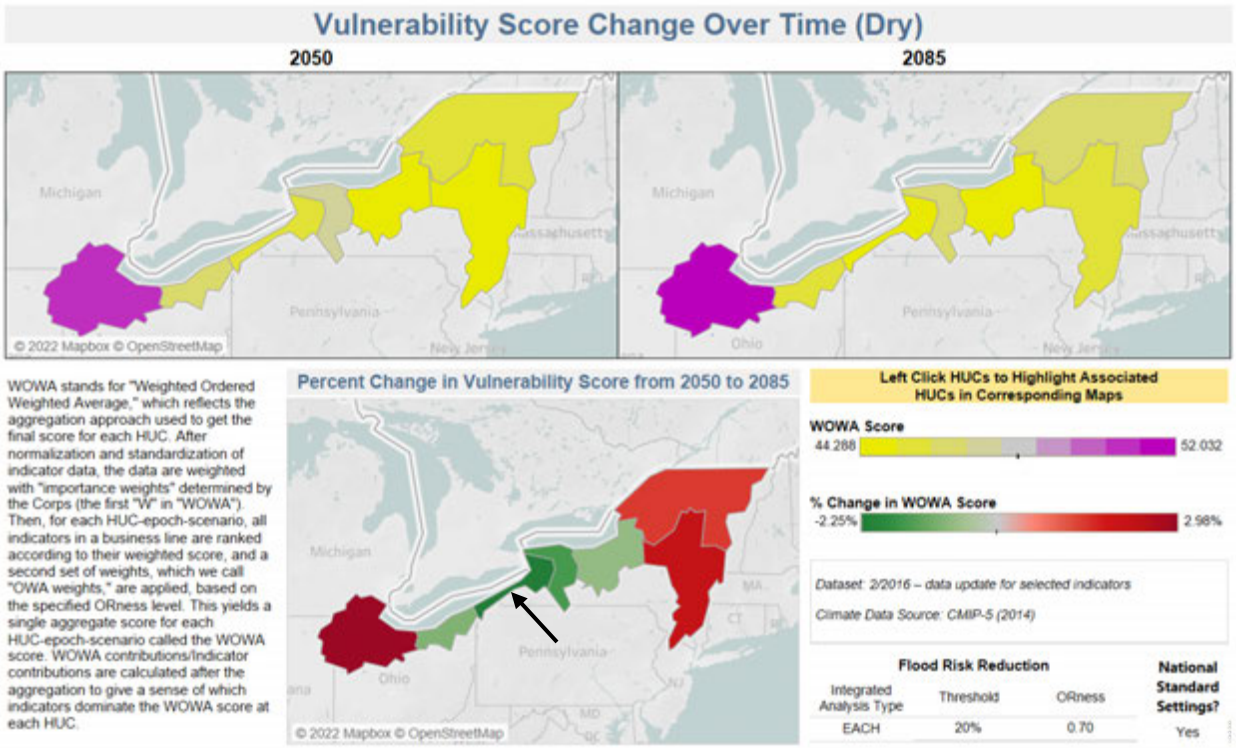


Figure 75. WOWA score and percent change in WOWA score for LRB during 2, 30-year epochs, dry scenario, for the Flood Risk Reduction business line. The Conneaut Creek watershed is within HUC 0412 "Lake Erie" (denoted with arrow).

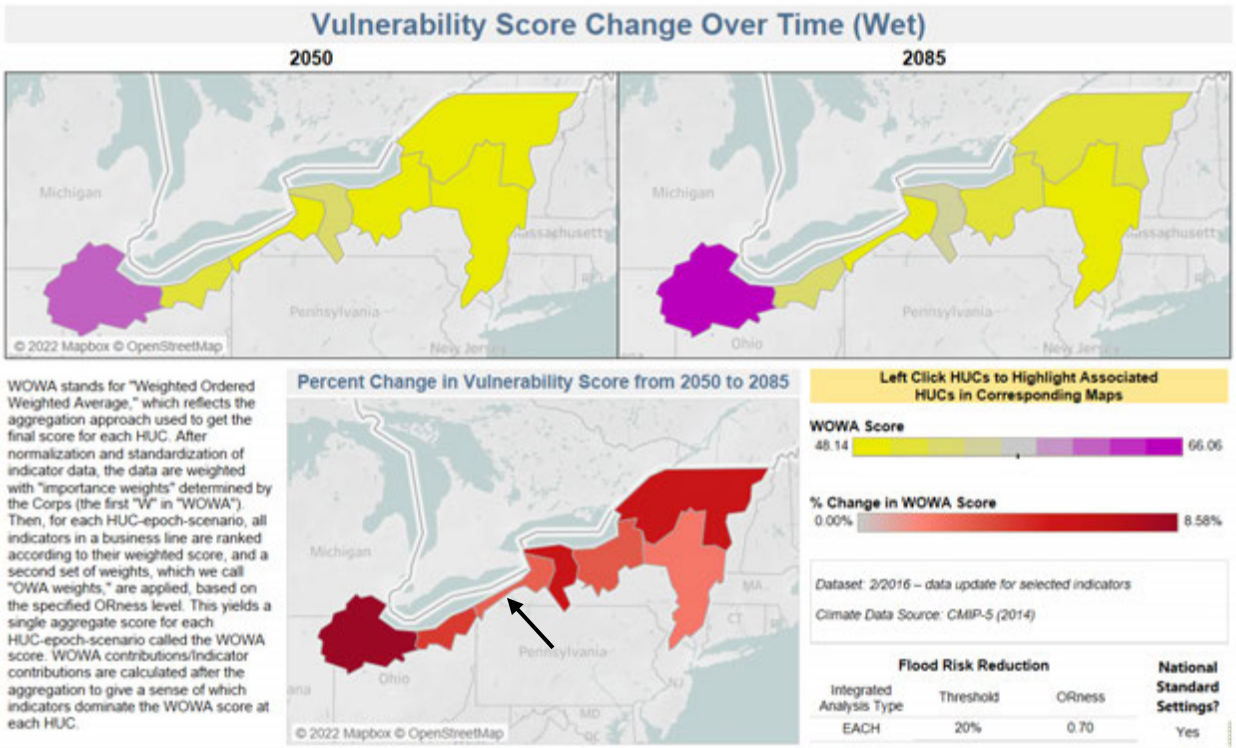


Figure 76. WOWA score and percent change in WOWA score for LRB during 2, 30-year epochs, wet scenario, for the Flood Risk Reduction business line. The Conneaut Creek watershed is within HUC 0412 "Lake Erie" (denoted with arrow).

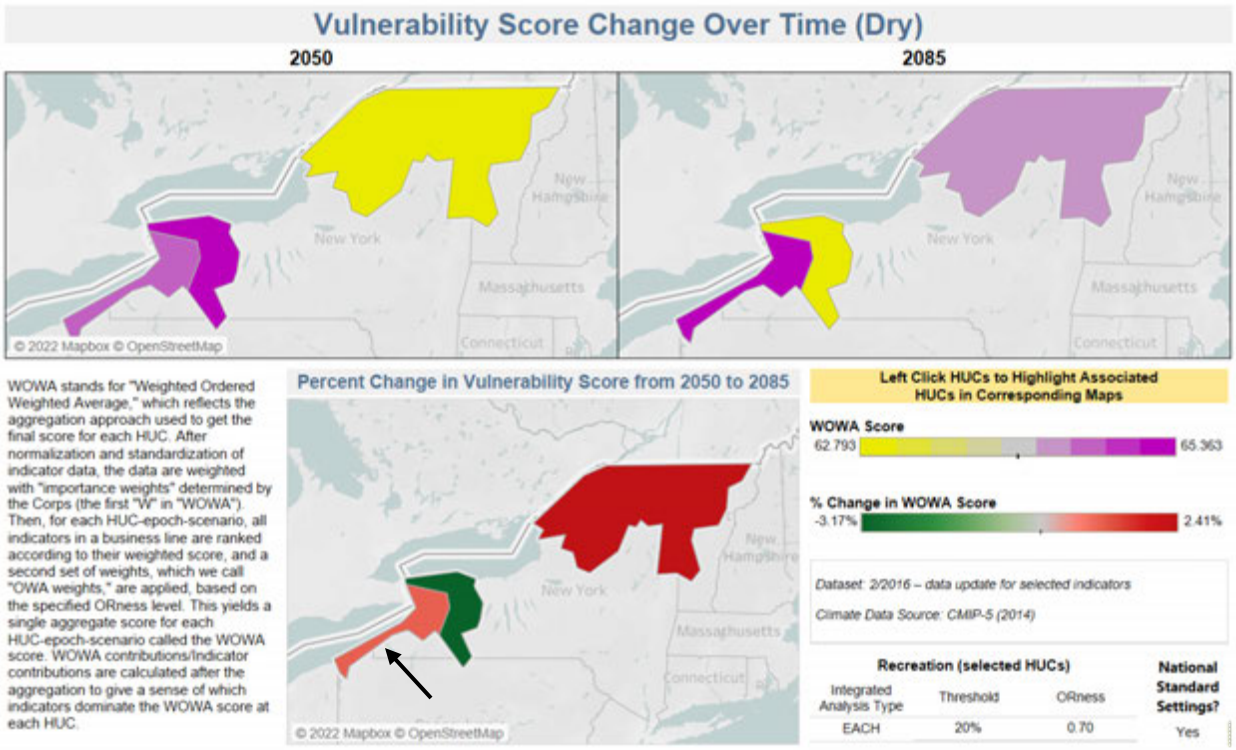


Figure 77. WOWA score and percent change in WOWA score for LRB during 2, 30-year epochs, dry scenario, for the Recreation business line. The Conneaut Creek watershed is within HUC 0412 "Lake Erie" (denoted with arrow).

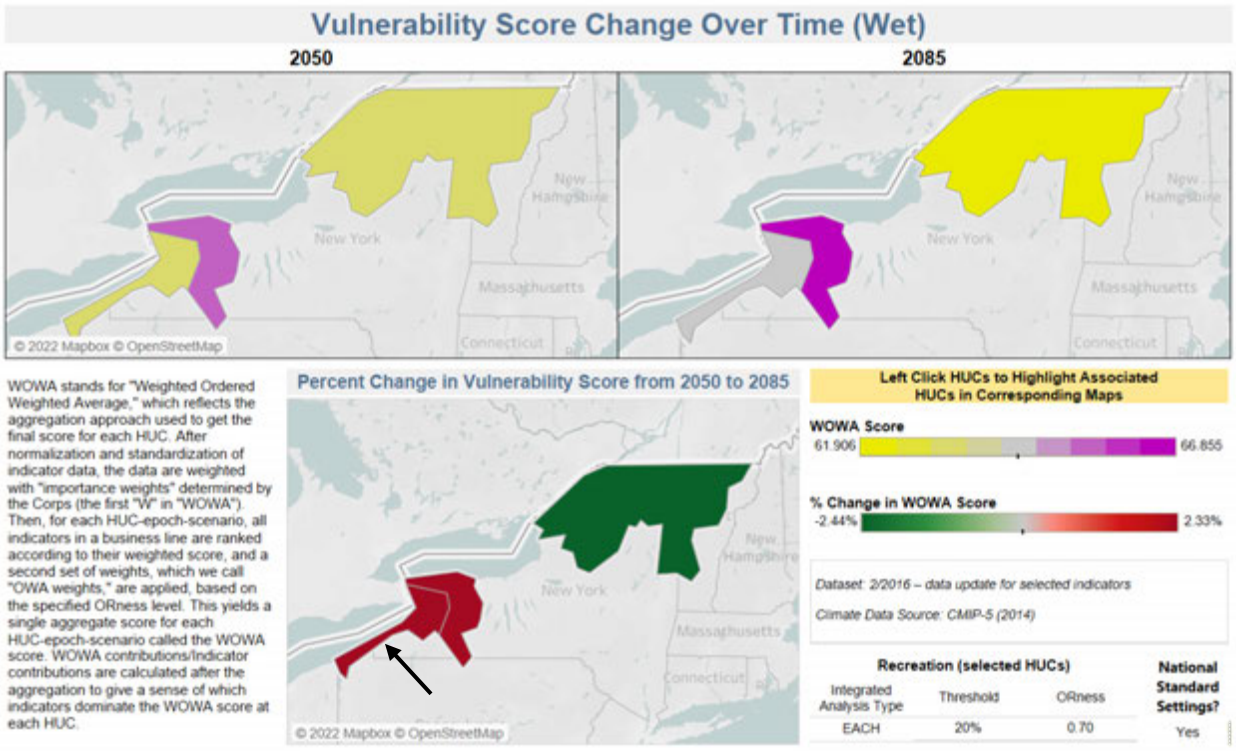


Figure 78. WOWA score and percent change in WOWA score for LRB during 2, 30-year epochs, wet scenario, for the Recreation business line. The Conneaut Creek watershed is within HUC 0412 "Lake Erie" (denoted with arrow).

The results of the VA Tool analysis of the 3 business lines in the HUC 0142 "Lake Erie" are found in Table 3. Within Table 17, a comparison can be made between the Lake Erie watershed's WOWA scores, the continental US Range of WOWA scores, the Northeast range of WOWA scores, and the Buffalo District range of WOWA scores. The Buffalo District has two HUC 04 watersheds that are outside of the Northeast region but, were included in the district range to compare relative to the rest of LRB. The Lake Erie watershed has zero business lines considered vulnerable (falls within the top 20% of vulnerability scores) relative to the other 201 HUC 04 watersheds in the continental US.

Table 17. Comparison of WOWA Scores for Conneaut Creek Business lines to Regional, Northeast, and LRB WOWA Ranges

Summary of Vulnerability					
Business Line	Scenario - Epoch	WOWA Score	Range Nationally	Range Northeast	Range LRB
Ecosystem Restoration	Dry - 2050	69.25	55.95 - 81.73	55.94 - 69.81	65.07 - 70.16
	Wet - 2050	68.88	55.64 - 89.84	55.34 - 69.70	64.83 - 70.84
	Dry - 2085	69.15	55.84 - 81.85	55.84 - 69.31	65.06 - 70.15
	Wet - 2085	69.45	54.69 - 89.43	54.69 - 70.41	65.62 - 73.69
Flood Risk Reduction	Dry - 2050	45.31	35.15 - 70.08	40.04 - 52.58	45.08 - 50.53
	Wet - 2050	48.29	39.80 - 92.85	43.13 - 54.82	48.14 - 60.84
	Dry - 2085	44.29	35.66 - 69.10	40.01 - 53.57	41.29 - 52.03
	Wet - 2085	49.68	40.86 - 86.71	43.12 - 56.91	49.68 - 66.06
Recreation	Dry - 2050	64.67	57.05 - 74.39	60.72 - 65.09	62.79 - 65.09
	Wet - 2050	63.16	57.67 - 85.65	60.76 - 63.35	63.16 - 65.35
	Dry - 2085	65.36	57.42 - 82.23	60.55 - 61.36	63.03 - 65.36
	Wet - 2085	64.64	56.23 - 83.62	61.38 - 66.86	61.91 - 66.86

7.5 Climate Change Summary

Relative to the other 201 HUC04 watersheds in the continental United States, the Lake Erie watershed was not determined to be highly vulnerable to the impacts of climate change for Ecosystem restoration, Flood Risk Reduction, and Recreation business lines. That is, the WOWA scores for the Lake Erie watershed were not in the top 20 percent of WOWA scores for all continental US watersheds. These results from the vulnerability assessment do not conclude that the Lake Erie watershed will not be impacted by climate change, however, imply that climate change will comparatively have less of an impact on the watershed relative to its impact on other HUC04 watersheds in the US. The WOWA scores imply that vulnerability of the Lake Erie watershed compared to regional watersheds and LRB watersheds is higher than when compared to all US watersheds.

Literature review of climate change shows a strong historic trend of increased precipitation and temperatures in the US and the Northeast from the early 20th century to today. Those trends are projected to continue with more precipitation and higher temperatures through the end of the 21st century according to several climate scenarios. More precipitation, higher temperatures and more frequent high magnitude storms usually leads to increased streamflow. However, looking under a smaller microscope than nationwide and regional trends, HUC-08 and gage level analysis of trends in streamflow for Conneaut Creek show a different trend.

The NSD tool identified no significant changes in recorded streamflow throughout the period of record for Conneaut Creek. Additionally, the monotomic trend analysis determined a statistically significant decreasing trend in flow. The CHAT tool also determined a statistically significant decrease in projected streamflow for the Chautauqua-Conneaut watershed. This is opposite of what would normally be expected with the projected climate-change scenarios. There is a discrepancy between both historic and projected increases in precipitation compared to streamflow for Conneaut Creek.

A potential reason why increased precipitation has not correlated to increased streamflow could be the land use of the watershed. The Conneaut Creek watershed has little development and is a largely forested and agricultural watershed. This could buffer streamflow increases due to the amount of storage, interception, and infiltration of precipitation within the watershed leading to less runoff and increased time of concentration. The projected streamflow analysis is a linear regression of historic data extrapolated in the future. There could be a point where these 'buffering factors' for precipitation are exceeded due to continued increases in the future and streamflow in turn starts to increase.

The effects of climate change on the watershed can be both negative and positive. While occasional flooding can be beneficial in terms of ecosystem restoration as floodplain/riparian habitat and wetlands are inundated more frequently, it could also negatively affect native fish instream habitat, migration and sediment transport due to increases in frequency and magnitude of large flows in the river. Conversely, significant droughts or a decreasing trend in streamflow in the basin could also negatively affect fish migration, particularly steelhead runs, due to insufficient streamflow for adequate spawning pool depths. Decreases in streamflow could also negatively impact recreation (water sports, fishing, etc.). Flood risk reduction would either be increased or decreased with decreasing trends or increasing trends in streamflow, respectively.

In terms of a lamprey barrier, increases in flow would lead to the assumption that the level of protection against lamprey migration is decreased, at least in terms of flow frequency. That is, if the project was designed to the 10% ACE plus 18" elevation, the 10% ACE flow over time would increase and the barrier design would provide protection for an event that historically was a 10% ACE event but is now a more frequent event. Higher and more frequent events could also mean secondary protection against lamprey (e.g., electrical) are utilized more frequently and for a longer duration. A decrease in flows would result in the project providing a higher level of protection than initially designed for. Considerations of climate change on the barrier level of protection and fish passage structures will be considered in the final design of the structure. Table 18 indicates potential residual risks to the Project due to climate change, along with a qualitative rating of how likely those residual risks are to materialize and undermine Project measures, resulting in harm to the Study area.

Table 18. Residual Risk Due to Climate Change

Project Measure	Trigger	Hazard	Harm	Qualitative Likelihood	Justification of Likelihood Rating
Sea Lamprey Barrier	Increased Discharge and WSE	Future flood discharges may be greater than at present.	Decreased level of protection against lamprey migration than designed for. Increased utilization of secondary barrier measures (electrical barrier).	Possible	Regional Climate Change trends indicate increases in precipitation and streamflow. However, HUC-8 analysis and gage level analysis indicated decreasing trends in streamflow for the watershed.
	Decreased Discharge and WSE	Future discharges may be less than at present.	Challenges for native species migration past the barrier due to designed features of the barrier (jumping pool, fishway) becoming less effective with lower baseflow stages.	Possible	Statistically significant decreasing trend in streamflow projected for the Conneaut Watershed from climate change analysis. However, this is contrary to regional models
	Increased Air Temperature	No hazards associated with temperature for the barrier.	No harm associated with increased temperature for the measure.	Likely	There is strong evidence in the literature, and observed and projected data that temperatures will increase.

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US Army Corps of Engineers®
Buffalo District

CONNEAUT CREEK SEA LAMPREY BARRIER PROJECT
P2# 495058

Section 506 – Water Resources Development Act of 1992, as amended Great Lakes Fishery and Ecosystem Restoration

Erie County, Pennsylvania

Appendix A-3:
Preliminary Geotechnical Evaluation

1. Background

Construction of a lamprey barrier is proposed downstream of the Griffey Road bridge over Conneaut Creek. A conceptual plan view provided by the project civil/structural engineer is included as Figure 4. The project geotechnical engineer was a late edition to the PDT and was informed that only minimal civil/structural engineering analyses of the barrier concept has been performed and that a geotechnical investigation and detailed evaluation will be delayed until the final design stage.

2. Geology

A map of glacial deposits in Erie County, PA is included as Figure 1. This figure indicates that Conneaut Creek in the project area cuts through end moraine deposits, which typically consist of glacial till. Alluvium may be present in the floodplain of the creek. A bedrock geology map is included as Figure 2. It indicates that the project area is underlain by the Devonian age Chadakoin Formation, which is composed of siltstone and some sandstone, interbedded with shale.

3. Griffey Road Bridge Plans

PADOT plans associated with construction activities at the Griffey Road bridge are included in Attachment 1. The last page of Attachment 1 includes information obtained from six borings that were placed to inform design and construction of the bridge, which was built in the late 1940's. The boring locations and subsurface information collected are shown on Figure 3. During placement of the borings, a ¾-inch diameter rod was driven by a 50-pound hammer using a 24-inch stroke, and the number of blows required to advance the rod were recorded. All borings were extended to refusal in bedrock, which was described as limestone. Rather than limestone, this bedrock may be siltstone that is relatively hard and durable compared to shale. Directly above the "limestone," two of the borings placed on the creek banks encountered a thin layer of material described as shale.

4. Preliminary Geotechnical Evaluation

The barrier foundation should be placed in competent bedrock. Competent bedrock at the site presumably consists of Devonian age siltstone that is relatively hard and durable compared to Devonian age shale. Depending on the volume of bedrock excavation, pre-drilling and the use of hydraulic rippers/hammers may be needed.

As proposed, the barrier abutment wall would tie into the existing Griffey Road bridge embankment on the right bank. An engineering evaluation will be needed to ensure that the existing bridge structures will not be negatively impacted by the project.

If this project proceeds to final design, sufficient time should be allocated to allow for a geotechnical field investigation and evaluation.

5. References

Pennsylvania Natural Heritage Program. 2012. *Erie County Natural Heritage Inventory*. Western Pennsylvania Conservancy. Pittsburgh, PA.

FIGURES

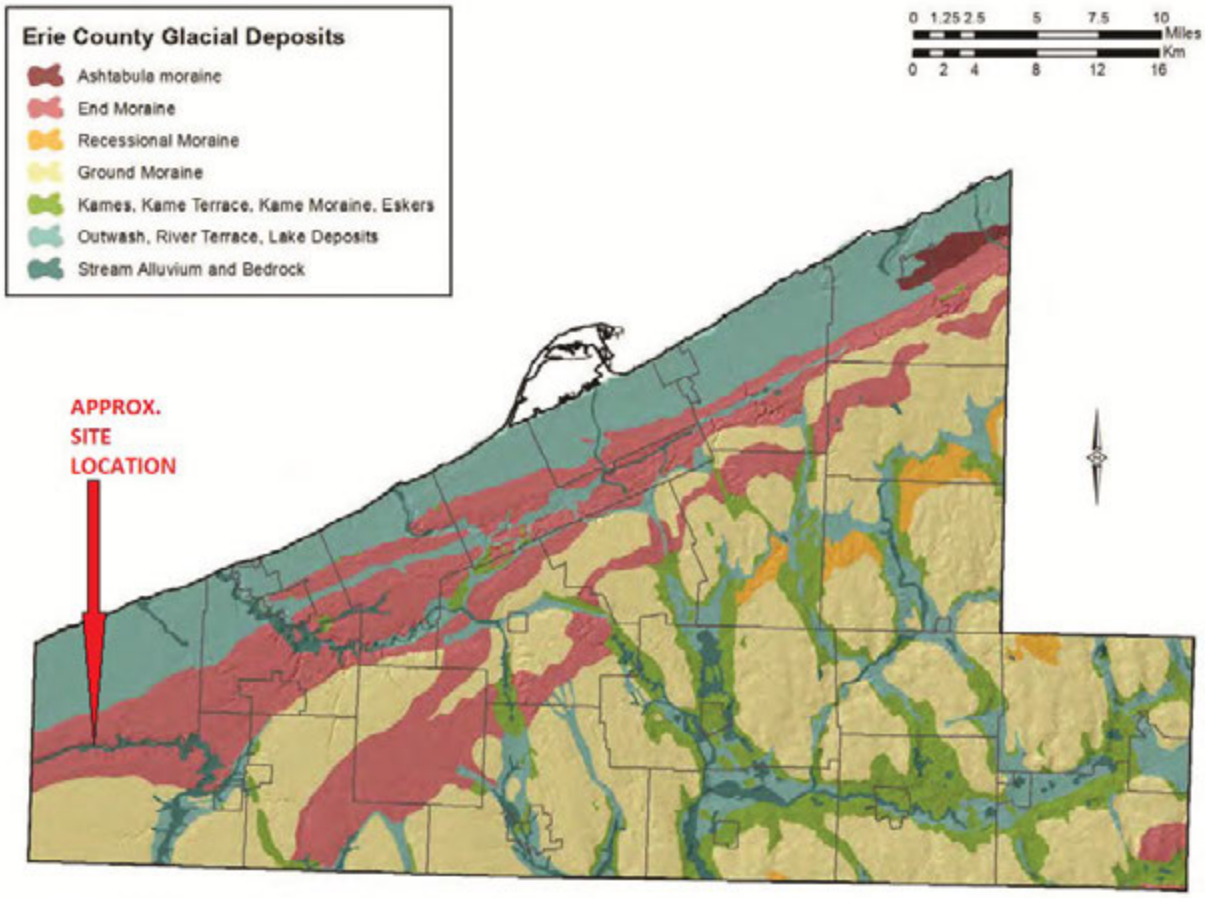


Figure 1: Surficial deposits from Wisconsin and Illinoisan glaciations in Erie County.(PNHP, 2012)

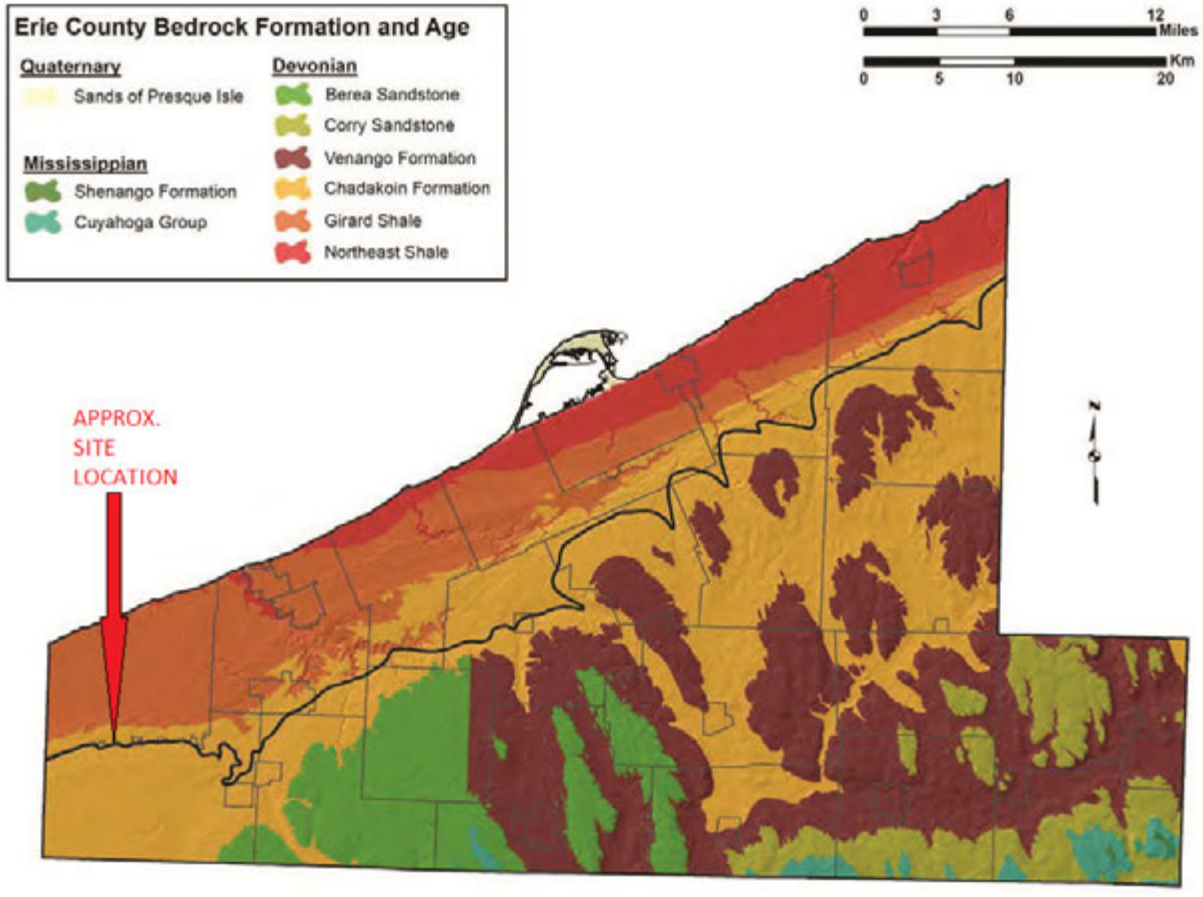


Figure 2: Bedrock geology and physiographic regions of Erie County. The black line delineates the Central Lowlands Physiographic Province – Eastern Lake Section to the north and the Appalachian Plateaus Physiographic Province-Northwestern Glaciated Plateau Section to the south. Municipalities are outlined in gray. (PNHP, 2012)

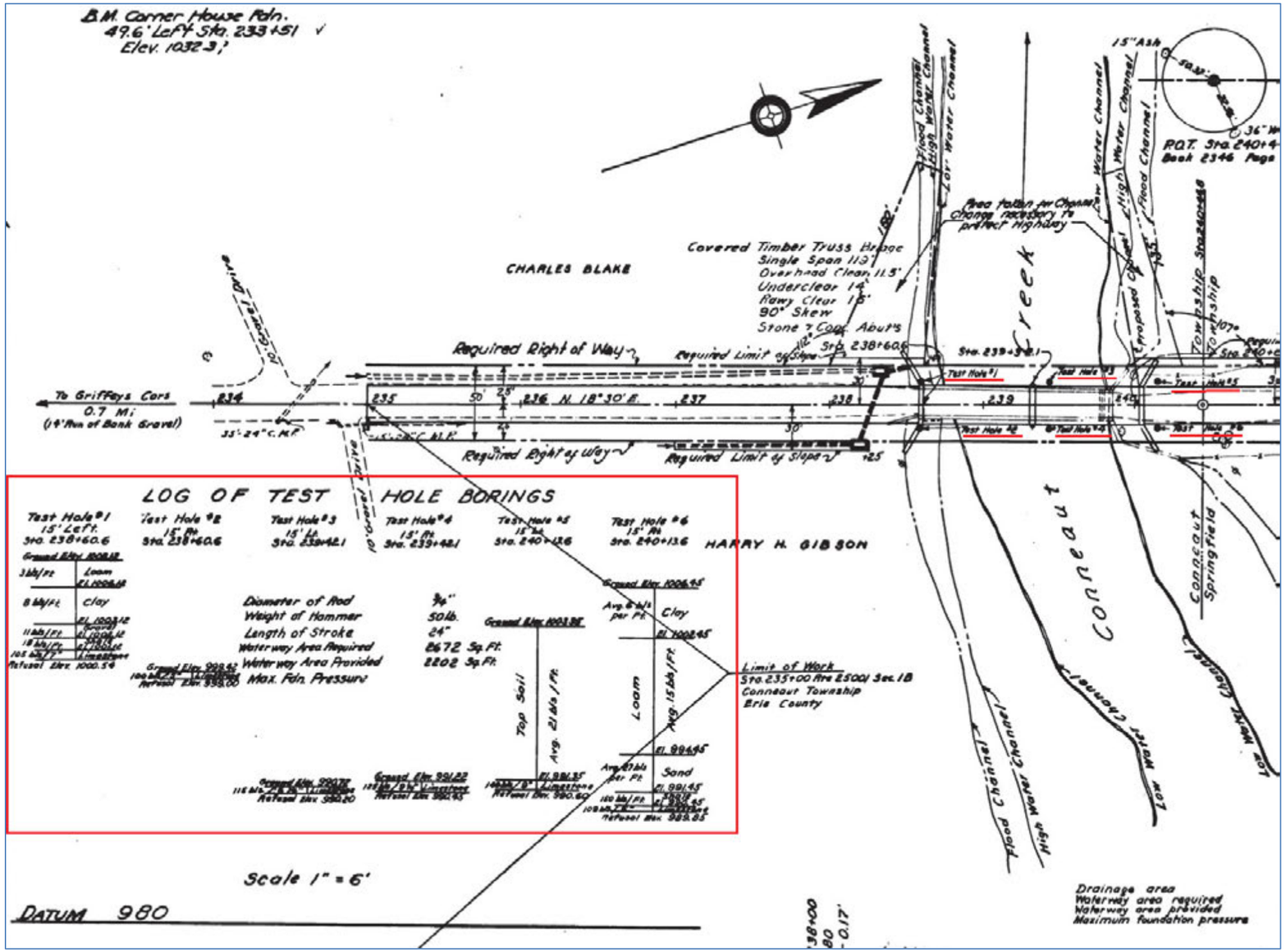


Figure 3: Borings placed for 1948 bridge construction

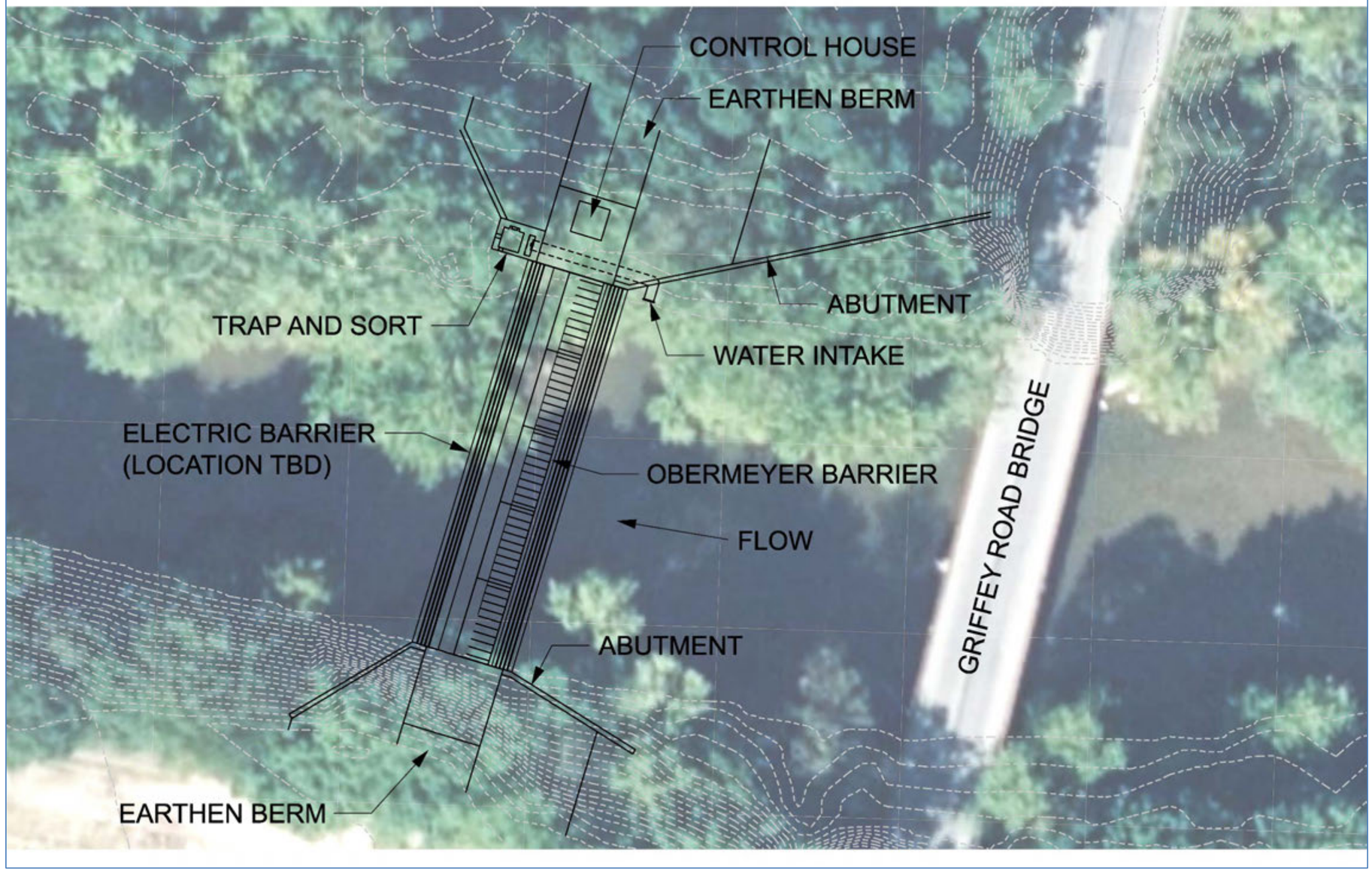


Figure 4: Conceptual plan view of proposed fish barrier

ATTACHMENT 1

PLAN PREPARATION
DESIGNER SHAWN P. PAINTER

916	DISTRICT	COUNTY	TOWNSHIP	BOROUGH	ROUTE	SECTION	TOTAL SHEETS
	1-0	ERIE	SPRINGFIELD		3001	B00	9
			CONNEAUT				

WBS ELEMENT									
T/P	SYS	SR or WO	SPUR	PHA	SECTION	ORG.	PRG.	P_C
P	0	03001	0	7	B01	120	324	2

S.R. 3001 PREVIOUSLY KNOWN AS L.R. 25001 ECMS No. 82921

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF TRANSPORTATION

DRAWINGS
FOR
CONSTRUCTION
OF

STATE ROUTE 3001 SECTION B01

IN ERIE COUNTY

FROM STA. 237+20.00 TO STA. 241+40.00 LENGTH 268.00 FT. 0.050 MI.
FROM SEG. 0090 OFFSET 1361 TO SEG. 0100 OFFSET 0279

ALSO INCLUDED:

TRAFFIC CONTROL PLAN	1 SHEET
STRUCTURE PLAN - S-29452	7 SHEETS
CROSS SECTIONS	4 SHEETS

SCALE

HORIZONTAL 0 25 50 FEET

VERTICAL 0 5 10 FEET

DESIGN DESIGNATION

		TRAFFIC DATA	
HIGHWAY CLASSIFICATION	-RURAL LOCAL	CURRENT A.D.T.	- 456 (2010)
DESIGN SPEED	-40 MPH	DESIGN YEAR A.D.T.	- 826 (2030)
PAVEMENT WIDTH	-(2) 10 FT.	D.H.V.	-83
SHOULDER WIDTH	-N/A	D	-55%
		T	-19%

RECORDED IN THE OFFICE FOR THE RECORDING OF DEEDS, ETC. IN
ERIE COUNTY, PA.
IN ____ BOOK ____ PAGE ____
WITNESS MY HAND AND SEAL OF OFFICE
DATE
RECORDER

COMMONWEALTH OF PENNSYLVANIA
COUNTY OF DAUPHIN SS
BEFORE ME, A NOTARY PUBLIC, PERSONALLY CAME ____ SECRETARY OF TRANSPORTATION, WHO ACKNOWLEDGED THE WITHIN PLAN, COMPRISING ____ SEPARATE SHEETS, TO BE AN OFFICIAL PLAN OF THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION AND DESIRED THAT THE SAME BE RECORDED AS SUCH.
WITNESS MY HAND AND NOTARIAL SEAL ____

PREPARED BY:
DISTRICT 1-0
PLANS UNIT

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL DONALD E. HALL, JR. ENGINEER No. 041272E

DE Hall
DONALD E. HALL, JR. P.E.
ASST. DIST. EXEC. DESIGN
DATE: May 18, 2010

RECOMMENDED DATE: May 18, 2010
Paul A. Miller
DISTRICT PLANS ENGINEER

RECOMMENDED DATE: May 18, 2010
DISTRICT EXECUTIVE

RECOMMENDED DATE: May 18 2010
Scott Christ
DEPUTY SECRETARY

APPROVED DATE: May 18 2010
Mrs. D. Biehler
SECRETARY OF TRANSPORTATION
(ON BEHALF OF THE GOVERNOR AS WELL AS HIMSELF)

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
1-0	ERIE	3001	B01	2 OF 9
SPRINGFIELD AND CONNEAUT TOWNSHIPS				

REVISION NUMBER	REVISIONS	DATE	BY

RECORD OF EXISTING ROAD TYPES

ADJACENT TO LIMIT OF WORK STA. 237+20.00	20' OF SURFACE TREATMENT,SEAL COAT ON 20' OF 4" COLD RECYCLED BITUMINOUS CONCRETE BASE CRSE. ON 20' OF STABILIZED EARTH
FROM STA. 237+20.00 TO STA. 238+61.25	20' OF SURFACE TREATMENT,SEAL COAT ON 20' OF 4" COLD RECYCLED BITUMINOUS CONCRETE BASE CRSE. ON 20' OF STABILIZED EARTH
FROM STA. 238+61.25 TO STA. 240+02.75	STRUCTURE
FROM STA. 240+02.75 TO STA. 241+40.00	20' OF SURFACE TREATMENT,SEAL COAT ON 20' OF 4" COLD RECYCLED BITUMINOUS CONCRETE BASE CRSE. ON 20' OF STABILIZED EARTH
ADJACENT TO LIMIT OF WORK STA. 241+40.00	20' OF SURFACE TREATMENT,SEAL COAT ON 20' OF 4" COLD RECYCLED BITUMINOUS CONCRETE BASE CRSE. ON 20' OF STABILIZED EARTH

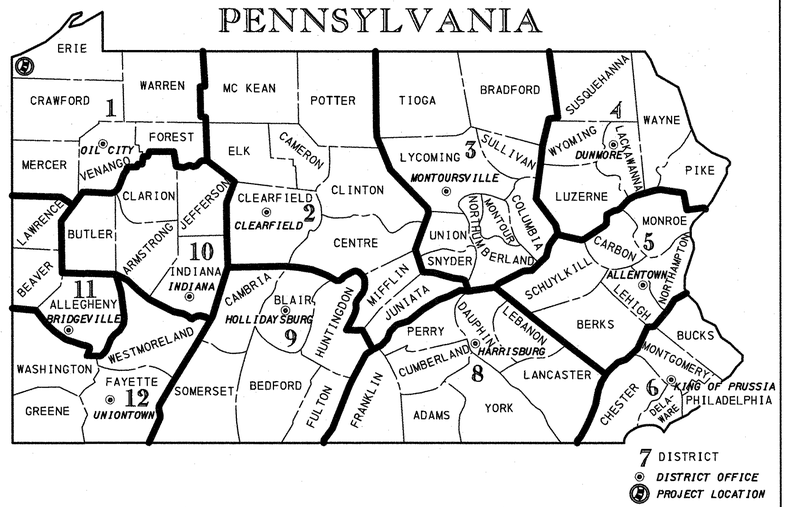
NOTE : THE DEPTHS OF MATERIAL SHOWN ARE FOR DESIGN PURPOSES ONLY. ANY RISK OF UNANTICIPATED COSTS ASSOCIATED WITH DIFFERENCES BETWEEN THE LISTED DEPTHS AND THE ACTUAL DEPTHS SHALL BE ACCEPTED BY THE CONTRACTOR.

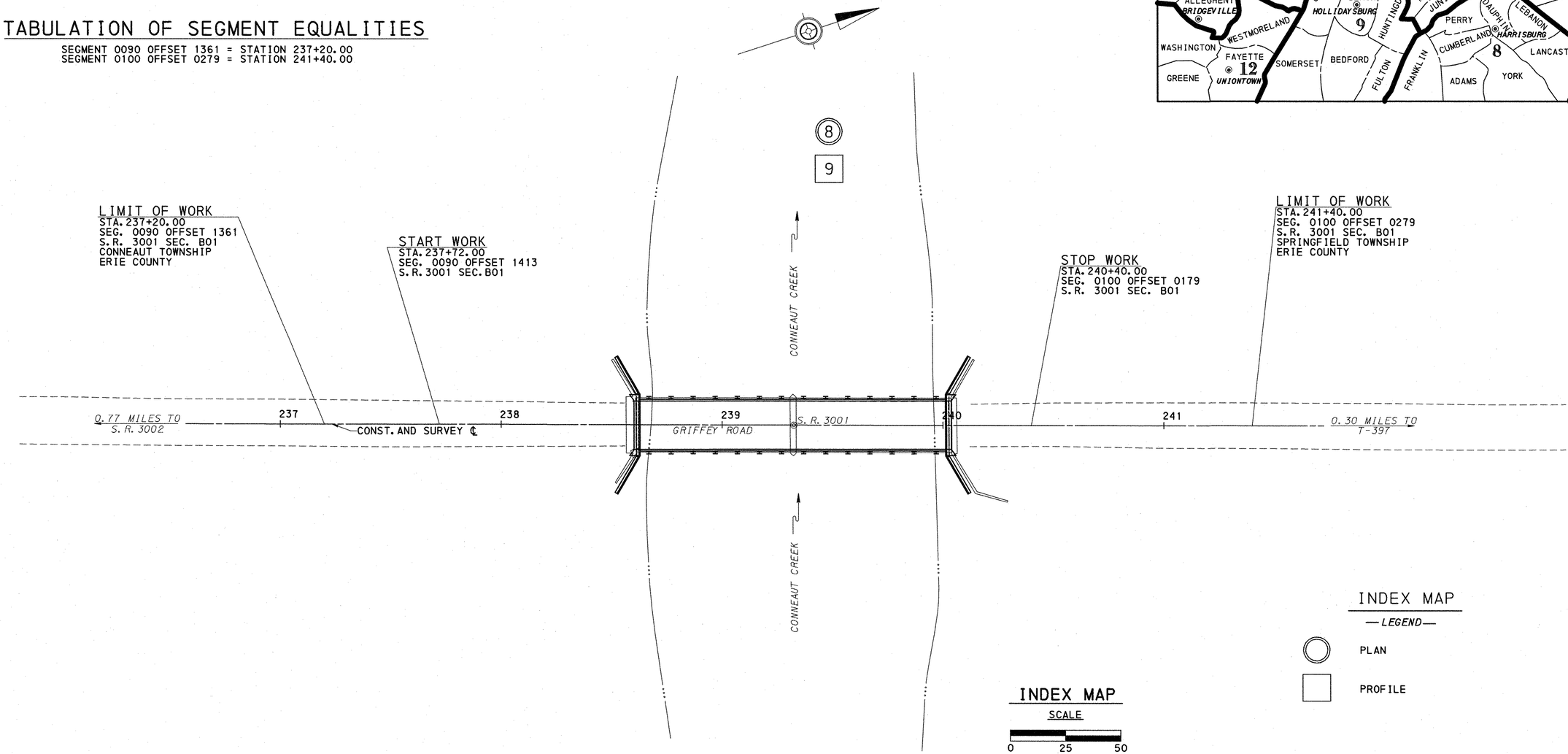
TABULATION OF SEGMENT EQUALITIES

SEGMENT 0090 OFFSET 1361 = STATION 237+20.00
SEGMENT 0100 OFFSET 0279 = STATION 241+40.00

SHEET INDEX BLOCK

DESCRIPTION	SHEET
TITLE SHEET	1
INDEX MAP	2
LOCATION MAP	3
TYPICAL SECTIONS AND DETAILS	3 & 4
SUMMARY SHEET	5
TABULATION SHEETS	6,7
PLAN SHEET	8
PROFILE SHEET	9
SUPPLEMENTAL PLANS	
TRAFFIC CONTROL PLAN	1
STRUCTURE PLANS S-29452	1 TO 7
CROSS SECTION SHEETS	1 TO 4





INDEX MAP
SCALE
0 25 50

INDEX MAP
— LEGEND —
PLAN
PROFILE

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL ENGINEER
PAUL A. MILLER
No. 043191-E

PLOTTED: 18-MAY-2010 09:11
D-9012 CADD (02-90) REVISED (10-04)
OPERATOR:
FILE NAME: G:\ds10\E3001B01\Inroads\E3001B012d.dgn

TABULATION OF OVERALL LENGTH

STA. 237+20.00 TO STA. 241+40.00 = 420.00 LF = 0.079 MI.

TABULATION OF CONSTRUCTION LENGTH

STA. 237+72.00 TO STA. 240+40.00 = 268.00 LF = 0.050 MI.

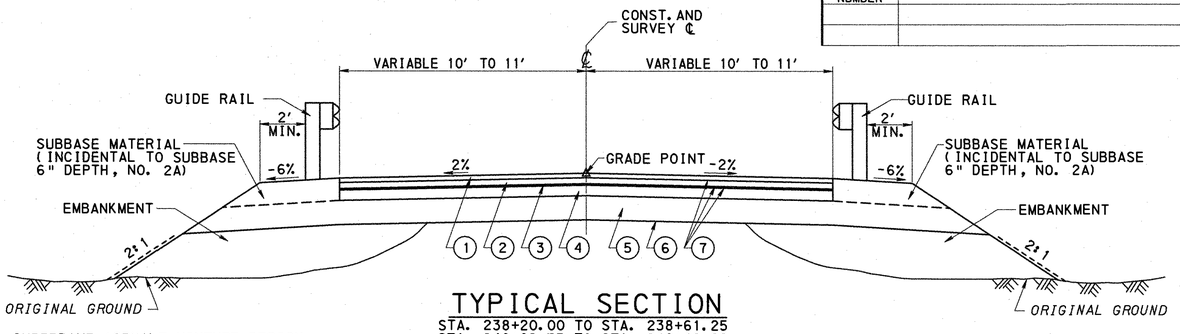
LIST OF EQUALITIES

NONE

REVISION NUMBER	REVISIONS	DATE	BY

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
1-0	ERIE	3001	B00	3 OF 9

SPRINGFIELD AND CONNEAUT TOWNSHIPS



TYPICAL SECTION

STA. 238+20.00 TO STA. 238+61.25
STA. 240+02.75 TO STA. 240+40.00

1. SUPERPAVE ASPHALT MIXTURE DESIGN HMA WEARING COURSE, PG 58-28, <0.3 MILLION ESALS, 9.5mm MIX, 1½" DEPTH, SRL-L
2. SUPERPAVE ASPHALT MIXTURE DESIGN HMA BINDER COURSE(LEVELING), PG 58-28, <0.3 MILLION ESALS, 19.0mm MIX (2" MIN. DEPTH)
3. SUPERPAVE ASPHALT MIXTURE DESIGN HMA WEARING COURSE (SCRATCH), PG 58-28, <0.3 MILLION ESALS, 9.5mm MIX, SRL-L, FINE GRADED, (60#/SY)
4. SUPERPAVE ASPHALT MIXTURE DESIGN HMA BASE COURSE, PG 58-28, <0.3 MILLION ESALS, 25.0mm MIX, 4" DEPTH
5. SUBBASE 6" DEPTH (NO. 2A)
6. GEOTEXTILE, CLASS 4, TYPE A
7. BITUMINOUS TACK COAT

LEGEND

----SEEDING AND SOIL SUPPLEMENTS

EARTHWORK SUMMARY ENTIRE PROJECT

THE INFORMATION ON ESTIMATED AMOUNTS OF EARTHWORK HAS BEEN USED IN THE PRELIMINARY ESTIMATE. DO NOT USE AS A WAIVER OF ANY PROVISIONS OF THE SPECIFICATIONS AND CONTRACTS.

CUBIC YARDS OF

EXCAVATION CLASS 1	EXCAVATION CLASS 3	SELECTED BORROW EXCAVATION STRUCTURE BACKFILL	SELECTED BORROW EXCAVATION COARSE AGGREGATE, NO. 57	SELECTED BORROW EXCAVATION ROCK R-4
68	▲ 59	▲ 42	▲ 18	▲ 24

▲ QUANTITIES INCLUDED IN BRIDGE ITEMS

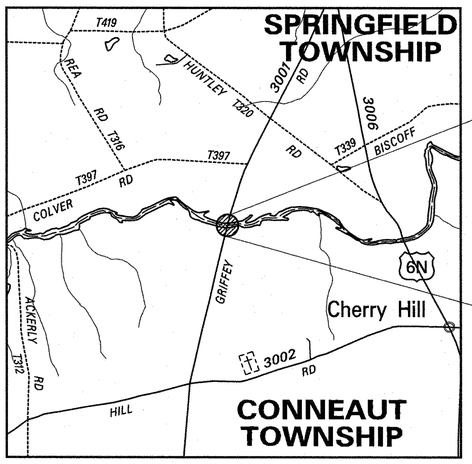
SUMMARY OF PROJECT COORDINATES

BASED ON ARBITRARY COORDINATE SYSTEM

RTE.	STATION	POINT	COORDINATES NORTH	COORDINATES EAST	BEARING
3001 CONST. & SURVEY ℄	236+57.34	P.O.T.	10000.0000	20000.0000	N18° 30' 00"E
	241+72.34	P.O.T.	10488.3867	20163.4119	
		C.P. #11	10000.0000	20000.0000	
		C.P. #12	10141.7822	20062.4341	
		C.P. #13	10355.6703	20134.6174	
		C.P. #14	10488.3867	20163.4119	

FOUR PLACE COORDINATES ARE FOR COMPUTATIONAL PURPOSES ONLY AND DO NOT IMPLY A PRECISION BEYOND TWO DECIMAL PLACES

LOCATION MAP



LIMIT OF WORK
STA. 241+40.00
SEG. 0100 OFFSET 0279
S.R. 3001 SEC. B01
SPRINGFIELD TOWNSHIP
ERIE COUNTY

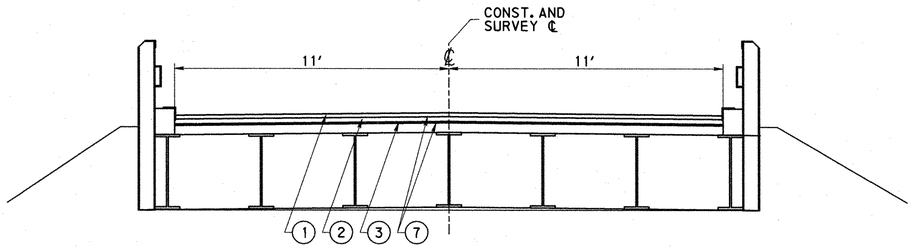
LIMIT OF WORK
STA. 237+20.00
SEG. 0090 OFFSET 1361
S.R. 3001 SEC. B01
CONNEAUT TOWNSHIP
ERIE COUNTY

LEGEND

——— STATE ROUTE
- - - - - TOWNSHIP ROAD
PROJECT
FOR DETOUR SEE TRAFFIC CONTROL PLAN

SCALE

0 0.5 1 2 MILES



1. SUPERPAVE ASPHALT MIXTURE DESIGN HMA WEARING COURSE, PG 58-28, <0.3 MILLION ESALS, 9.5mm MIX, 1½" DEPTH, SRL-L
2. SUPERPAVE ASPHALT MIXTURE DESIGN HMA BINDER COURSE(LEVELING), PG 58-28, <0.3 MILLION ESALS, 19.0mm MIX (2" MIN. DEPTH)
3. SUPERPAVE ASPHALT MIXTURE DESIGN HMA WEARING COURSE (SCRATCH), PG 58-28, <0.3 MILLION ESALS, 9.5mm MIX, SRL-L, FINE GRADED, (60#/SY)
7. BITUMINOUS TACK COAT

TYPICAL SECTION (STRUCTURE)

STA. 238+61.25 TO STA. 240+02.75

GENERAL NOTES

S.R. 3001 FORMERLY L.R. 25001

THE LEGAL RIGHT-OF-WAY ON S.R. 3001, ALSO KNOWN AS GRIFFEY ROAD AND FORMERLY KNOWN AS L.R 25001, FROM STATION 237+20.00 TO STATION 241+40.00 IS 50 FEET IN WIDTH BASED ON ROAD DOCKET "B" PAGE 16. RECORDED IN THE ERIE COUNTY COURT HOUSE. THE ACTUAL WIDTH OCCUPIED BY THE BRIDGE OR CULVERT STRUCTURE FOR OVER 21 YEARS, AND THE AREA REQUIRED TO MAINTAIN THE BRIDGE OR CULVERT STRUCTURE AS DETERMINED BY THE DEPARTMENT.

ALL WORK CONTEMPLATED ON THIS PROJECT IS CONFINED WITHIN THE EXISTING HIGHWAY RIGHT-OF-WAY.

SLOPES STEEPER THAN 3:1 SHALL BE SEEDED WITH FORMULA C SEED MIXTURE.

VERTICAL ELEVATIONS ARE BASED ON ASSUMED DATUM.

THERE ARE NO NAVIGABLE STREAMS ON THIS PROJECT.

(+25) 50' THE HALF CIRCLED NUMBER INDICATES A SCALED DIMENSION.

THE HORIZONTAL CONTROL IS BASED ON ARBITRARY COORDINATES.

CONSTRUCT PROJECT IN ACCORDANCE WITH SPECIFICATIONS, PUBLICATION 408, DATED 2007.

THREE WORKING DAYS PRIOR TO EXCAVATION, THE CONTRACTOR MUST CONTACT THE PA. ONE CALL SYSTEM, INC., PHONE 1-800-242-1776 SERIAL NO. _____ FOR CONNEAUT TOWNSHIP AND SERIAL NO. _____ SPRINGFIELD TOWNSHIP.

DETAILS, OTHER THAN THOSE INDICATED, ARE ON THE FOLLOWING STANDARD DRAWINGS:

RC- 10M	APRIL	15,2004	BC- 736M	JAN.	21,2003
RC- 11M	APRIL	15,2004	BC- 751M	DEC.	29,2008
RC- 12M	MARCH	30,2006	BC- 783M	JULY	20,2007
RC- 13M	APRIL	15,2004	BC- 788M	JAN.	21,2003
RC- 30M	AUG.	29,2008			
RC- 33M	MARCH	30,2006			
RC- 45M	AUG.	29,2008			
RC- 46M	AUG.	29,2008			
RC- 52M	MARCH	30,2006			
TC- 8600	AUG.	29,2008			
TC- 8716	JUNE	23,2009			

PUBLIC UTILITIES

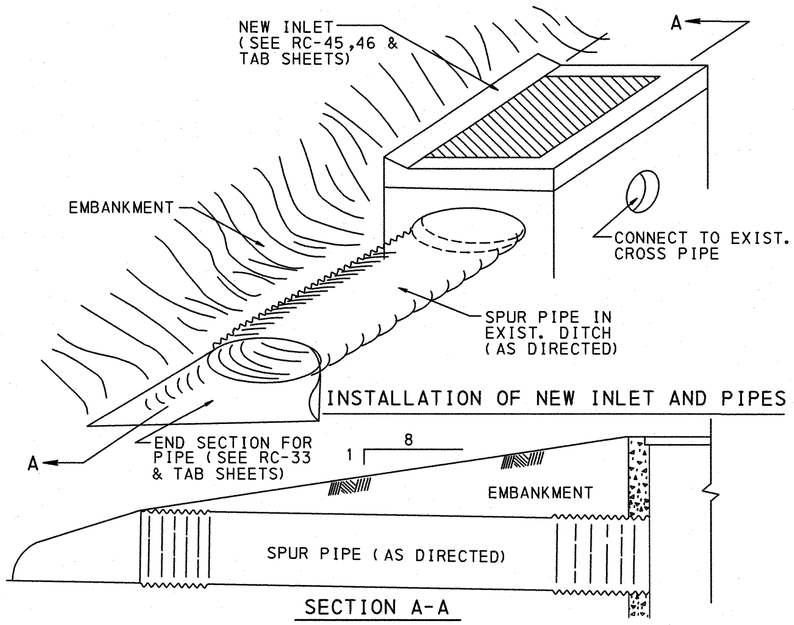
PENNSYLVANIA ELECTRIC COMPANY ——— E ———
5404 EVANS RD.
P.O. BOX 1101
ERIE, PA. 16558
ATTN: JOHN FORBES
PHONE: 814-868-8736

PA ONE CALL SYSTEM PHONE NO. 1-800-242-1776
SERIAL NO. 20101370926 CONNEAUT TWP.
SERIAL NO. 20101370927 SPRINGFIELD TWP.

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — PAUL A. MILLER — ENGINEER No. 043191-E

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
1-0	ERIE	3001	B01	4 OF 9
SPRINGFIELD AND CONNEAUT TOWNSHIPS				

REVISION NUMBER	REVISIONS	DATE	BY



STR- SEE STRUCTURE PLAN
TCP- SEE TRAFFIC CONTROL PLAN
PDA- PREDETERMINED PRICE IN PROPOSAL
◆ - SEE SPECIAL PROVISIONS

SUMMARY

REVISION NO	REVISIONS	DATE	BY	DISTRICT	COUNTY	ROUTE	SECTION	SHEET
					ERIE	3001	B01	5 OF 9
					CONNEAUT AND SPRINGFIELD TOWNSHIPS			

QUANTITY	ITEM NO / UNIT	DESCRIPTION	DESIGN NO	FOR TAB SEE SHEET
X	0201 0001 LS	CLEARING AND GRUBBING		NO TAB
~~70.544~~ 68	0203 0001 CY	CLASS 1 EXCAVATION		6
~~44.566~~ 58	0204 0100 CY	CLASS 3 EXCAVATION		STR
~~24.861~~ 24	0205 0264 CY	SELECTED BORROW EXCAVATION ROCK, CLASS R-4		STR
16.25 ~~18~~	0205 0285 CY	SELECTED BORROW EXCAVATION, COARSE AGGREGATE, NO. 57		STR
~~216.667~~ 272	0212 0014 SY	GEOTEXTILE, CLASS 4, TYPE A		6
~~1830~~ 184	0309 0022 SY	SUPERPAVE ASPHALT MIXTURE DESIGN, HMA BASE COURSE, PG 58-28, < 0.3 MILLION ESALS, 25.0 MM MIX, 4" DEPTH		6
~~216.667~~ 272	0350 0106 SY	SUBBASE 6" DEPTH (NO. 2A)		6
~~539.889~~ 530	0409 0085 SY	SUPERPAVE ASPHALT MIXTURE DESIGN, HMA WEARING COURSE, PG 58-28, < 0.3 MILLION ESALS, 9.5 MM MIX, 1 1/2" DEPTH, SRL-L		6
~~63.85~~ 60	0409 7070 TON	SUPERPAVE ASPHALT MIXTURE DESIGN, HMA BINDER COURSE (LEVELING), PG 58-28, < 0.3 MILLION ESALS, 19.0 MM MIX		6
~~356.889~~ 1244	0460 0001 SY	BITUMINOUS TACK COAT		6
✓44	0515 0001 LF	SAWING AND SEALING OF BITUMINOUS OVERLAYS		STR
✓10	4601 0315 LF	24" THERMOPLASTIC PIPE, GROUP I, 15'-1.5' FILL MODIFIED ◆		7
~~27.0~~ 28	4601 0319 LF	36" THERMOPLASTIC PIPE, GROUP I, 15'-1.5' FILL MODIFIED ◆		7
~~37.50~~ 48	4601 7326 LF	24" REINFORCED CONCRETE PIPE, TYPE B, 10' - 2' FILL MODIFIED ◆		7
✓1	0605 2740 SET	TYPE S CONCRETE TOP UNIT AND GRATE		7
✓1	0605 2750 SET	TYPE D-H CONCRETE TOP UNIT AND GRATES		7
✓1	0605 2854 EACH	TYPE 4 INLET BOX, HEIGHT </= 10'		7
✓1	0605 2882 EACH	TYPE D-H INLET BOX, HEIGHT </= 10'		7
X	0608 0001 LS	MOBILIZATION		NO TAB
X	0609 0004 LS	INSPECTOR'S FIELD OFFICE AND INSPECTION FACILITIES, TYPE C		NO TAB
X	0609 0009 LS	EQUIPMENT PACKAGE ◆		NO TAB
✓2	0615 0040 EACH	SUBSURFACE DRAIN OUTLET ENDWALL		6
✓2	0615 0066 EACH	66" RED SUBSURFACE DRAIN OUTLET MARKER		6
✓1	0616 0035 EACH	STEEL END SECTION, METALLIC COATED, 12 GAGE FOR 24" PIPE		7
✓4	0620 0402 EACH	TERMINAL SECTION, BRIDGE CONNECTION		7
~~200.0~~ 100	0620 0500 LF	RESET GUIDE RAIL		7
✓100	0620 0503 LF	REMOVE EXISTING GUIDE RAIL (CONTRACTOR'S PROPERTY)		7
~~0~~ 50	0620 0575 LF	GUIDE RAIL ELEMENT		7
✓75	0620 1075 LF	TYPE 2-S GUIDE RAIL		7
✓50	0620 1100 LF	TYPE 2-SC GUIDE RAIL		7
✓50	0620 1125 LF	TYPE 2-SCC GUIDE RAIL		7
✓2	0620 1250 EACH	TYPE 2 STRONG POST END TREATMENT		7
~~405.778~~ 405	4680 0120 SY	MEMBRANE WATERPROOFING SYSTEM INSTALLED ON BRIDGE DECK MODIFIED ◆		STR
~~19.556~~ 20	4680 0121 SY	MEMBRANE WATERPROOFING SYSTEM INSTALLED ON OTHER SURFACES MODIFIED ◆		STR
X	0689 0002 LS	NETWORK SCHEDULE		NO TAB
1.107 ~~1~~	4804 0012 LB	SEEDING AND SOIL SUPPLEMENTS - FORMULA C MODIFIED ◆		6
~~0~~ 1000	0845 0001 DOLLA	UNFORESEEN WATER POLLUTION CONTROL		NO TAB
16.0 ~~160~~	0865 0001 LF	SILT BARRIER FENCE, 18" HEIGHT		6
X	0901 0001 LS	MAINTENANCE AND PROTECTION OF TRAFFIC DURING CONSTRUCTION ◆		NO TAB
~~0~~ 20	0901 0231 DAY	ADDITIONAL WARNING LIGHTS, TYPE B		TCP
12.5 ~~100~~	0901 0240 SF	ADDITIONAL TRAFFIC CONTROL SIGNS		TCP
8 ~~6~~	0937 0114 EACH	GUIDE RAIL MOUNTED DELINEATOR TYPE D, (W/W)		7
✓6	0941 0001 EACH	RESET POST MOUNTED SIGNS, TYPE B		6
.875 ~~1~~	1001 0010 CY	CLASS A CEMENT CONCRETE		STR
2.148 ~~2~~	1001 0020 CY	CLASS C CEMENT CONCRETE		STR
68.0 ~~72~~	1001 0611 LF	6" STRUCTURE FOUNDATION DRAIN		STR
32.0 ~~42~~	1001 0730 CY	SELECTED BORROW EXCAVATION, STRUCTURE BACKFILL		STR
910.0 ~~913~~	1002 0053 LB	REINFORCEMENT BARS, EPOXY COATED		STR
✓12	1003 0008 EACH	DOWEL HOLES, 18" DEPTH		STR
X	1018 0050 LS	REMOVAL OF PORTION OF EXISTING BRIDGE ◆		STR
1479.00 ~~1469~~	1056 0100 LB	FABRICATED STRUCTURAL STEEL		STR
✓2	9000 0002 EACH	REMOVE EXISTING INLET ◆		7
25.25 ~~24~~	9000 0500 LF	PIER JOINT ENCASEMENT ◆		STR
✓24	9003 0001 EACH	DOWEL HOLES, 60" DEPTH ◆		STR
X	9071 0001 LS	SPOT/ZONE MAINTENANCE PAINTING OF EXISTING STRUCTURAL STEEL ◆		STR
X	9073 0010 LS	DISPOSAL OF BRIDGE WASTE ◆		STR
X	9075 0010 LS	CONTAINMENT ◆		STR
X	9077 0010 LS	WORKER HEALTH AND SAFETY ◆		STR
20.02 ~~17~~	9409 2095 TON	SUPERPAVE ASPHALT MIXTURE DESIGN, HMA WEARING COURSE (SCRATCH), PG 58-28, < 0.3 MILLION ESALS, 9.5 MM MIX, SRL-L, FINE GRADED ◆		6

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
PAUL A. MILLER
ENGINEER
043191-E

TABULATION OF QUANTITIES

ROADWAY

REVISION NO	REVISIONS	DATE	BY	DISTRICT	COUNTY	ROUTE	SECTION	SHEET
					ERIE	3001	B01	6 OF 9
					CONNEAUT AND SPRINGFIELD TOWNSHIPS			

CLASS 1 EXCAVATION 0203 0001 CY	~~CLASS III(3) EXCAVATION~~ ~~0204 0100~~ ~~CY~~	GEOTEXTILE, CLASS 4, TYPE A 0212 0014 SY		SUPERPAVE ASPHALT MIXTURE DESIGN, HMA BASE COURSE, PG 58-28, < 0.3 MILLION ESALS, 25.0 MM MIX, 4" DEPTH 0309 0022 SY	SUBBASE 6" DEPTH (NO. 2A) 0350 0106 SY	SUPERPAVE ASPHALT MIXTURE DESIGN, HMA WEARING COURSE, PG 58-28, < 0.3 MILLION ESALS, 9.5 MM MIX, 1 1/2" DEPTH, SRL-L 0409 0085 SY	SUPERPAVE ASPHALT MIXTURE DESIGN, HMA BINDER COURSE (LEVELING), PG 58-28, < 0.3 MILLION ESALS, 19.0 MM MIX 0409 7070 TON	BITUMINOUS TACK COAT 0460 0001 SY		SUBSURFACE DRAIN OUTLET ENDWALL 0615 0040 EACH	66" RED SUBSURFACE DRAIN OUTLET MARKER 0615 0066 EACH		SEEDING AND SOIL SUPPLEMENTS - FORMULA C MODIFIED 4804 0012 LB		SILT BARRIER FENCE, 18" HEIGHT 0865 0001 LF		RESET POST MOUNTED SIGNS, TYPE B 0941 0001 EACH	SUPERPAVE ASPHALT MIXTURE DESIGN, HMA WEARING COURSE (SCRATCH), PG 58-28, < 0.3 MILLION ESALS, 9.5 MM MIX, SRL-L, FINE GRADED 9409 2095 TON									ITEM NUM UNIT	REMARKS	SIDE	STATIONS
														.804															NEAR APPROACH		
36.592 ~~38~~		105.556 ~~146~~		90.778 ~~97~~	105.556 ~~146~~	90.778 ~~97~~	10 ~~11~~	~~0~~ ~~204~~						285 ~~0.5~~		16 ~~80~~			✓3									BITUMINOUS ROADWAY AREA	LT & RT	238+20.00 TO 238+61.25
																		✓1									RESET (CLEARANCE MARKER) SIGN	LT	238+48.34
																		✓1									RESET (CLEARANCE MARKER) SIGN	RT	238+53.64
																		✓1									RESET (SEGMENT MARKER) SIGN	RT	238+55.65
																											STRUCTURE		
										✓1	✓1																CONNECT TO STRUCTURE FOUNDATION DRAIN	LT	238+55.00
						356.889 ~~346~~	43.85 ~~39~~	356.889 ~~692~~											14.02 ~~11~~									BITUMINOUS OVER DECK	LT & RT	238+61.25 TO 240+02.75
										✓1	✓1																CONNECT TO STRUCTURE FOUNDATION DRAIN	LT	240+05.00
																											FAR APPROACH		
33.852 ~~30~~		111.111 ~~120~~		92.222 ~~87~~	111.111 ~~126~~	92.222 ~~87~~	✓10	~~0~~ ~~261~~						303 ~~0.8~~		~~0~~ ~~80~~			✓3									BITUMINOUS ROADWAY AREA	LT & RT	240+02.75 TO 240+40.00
																		✓2									RESET (CLEARANCE MARKER) SIGN	LT & RT	240+12.00
																		✓1									RESET (TOWNSHIP) SIGN	LT	240+27.69
70.544 ~~66~~		216.667 ~~272~~		183 ~~184~~	216.667 ~~272~~	539.889 ~~530~~	63.85 ~~60~~	1244		✓2	✓2			1.107 ~~1~~		16 ~~180~~		✓6	20.02 ~~11~~									TOTALS		

TABULATION OF QUANTITIES

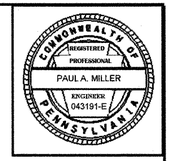
REVISION NO	REVISIONS	DATE	BY	DISTRICT	COUNTY	ROUTE	SECTION	SHEET
					ERIE	3001	B01	7 OF 9
					CONNEAUT AND SPRINGFIELD TOWNSHIPS			

DRAINAGE

24" THERMOPLASTIC PIPE, GROUP I, 15'-1.5' FILL MODIFIED 4601 0315 LF	36" THERMOPLASTIC PIPE, GROUP I, 15'-1.5' FILL MODIFIED 4601 0319 LF	24" REINFORCED CONCRETE PIPE, TYPE B, 10' - 2' FILL MODIFIED 4601 7326 LF	TYPE S CONCRETE TOP UNIT AND GRATE 0605 2740 SET	TYPE D-H CONCRETE TOP UNIT AND GRATES 0605 2750 SET	TYPE 4 INLET BOX, HEIGHT </= 10' 0605 2854 EACH	TYPE D-H INLET BOX, HEIGHT </= 10' 0605 2882 EACH	STEEL END SECTION, METALLIC COATED, 12 GAGE FOR 24" PIPE 0616 0035 EACH	REMOVE EXISTING INLET 9000 0002 EACH				REMARKS ITEM NUMBER UNIT	SIDE	STATIONS
												NEAR APPROACH		
				✓1		✓1		✓1				REMOVE EXIST INLET, REPLACE WITH PROPOSED DH INLET	RT	238+22.00
		37.5 ~~43~~										REMOVE EXIST. 24" CMP, REPLACE WITH PROP. 24" RCP. SEE CROSS SECTIONS	CL	238+28.50
✓10							✓1					CONNECT SPUR PIPE TO DITCH AND TYPE S INLET. SEE CROSS SECTIONS FOR INV.	LT	238+32.59
	27.0 ~~28~~											CONNECT TO TYPE S INLET, OUTLET PAST WING WALL. SEE CROSS SECTIONS	LT	238+32.59
			✓1		✓1			✓1				REMOVE EXIST. INLET, REPLACE WITH PROPOSED TYPE S INLET	LT	238+32.59
✓10	27.0 ~~28~~	37.5 ~~43~~	✓1	✓1	✓1	✓1	✓1	✓2				TOTALS		

GUIDE RAIL

TERMINAL SECTION, BRIDGE CONNECTION 0620 0402 EACH	RESET GUIDE RAIL 0620 0500 LF	REMOVE EXISTING GUIDE RAIL (CONTRACTOR'S PROPERTY) 0620 0503 LF	GUIDE RAIL ELEMENT 0620 0575 LF	TYPE 2-S GUIDE RAIL 0620 1075 LF	TYPE 2-SC GUIDE RAIL 0620 1100 LF	TYPE 2-SCC GUIDE RAIL 0620 1125 LF	TYPE 2 STRONG POST END TREATMENT 0620 1250 EACH	GUIDE RAIL MOUNTED DELINEATOR TYPE D, (W/W) 0937 0114 EACH				REMARKS ITEM NUMBER UNIT	SIDE	STATIONS
												NEAR APPROACH		
✓1		✓12.5	~~✓12.5~~	✓25	✓12.5	✓12.5	✓1	2				ADD GUIDE RAIL ELEMENT TO 2-SCC GUIDE RAIL FOR ADDED STRENGTH	LT	237+72.00 TO 238+61.25
✓1		✓12.5	~~✓12.5~~	✓25	✓12.5	✓12.5	✓1	2				ADD GUIDE RAIL ELEMENT TO 2-SCC GUIDE RAIL FOR ADDED STRENGTH	RT	237+72.00 TO 238+61.25
												FAR APPROACH		
✓1	~~100~~ 50	✓37.5	~~✓12.5~~	✓12.5	✓12.5	✓12.5		2 ~~1~~				ADD GUIDE RAIL ELEMENT TO 2-SCC GUIDE RAIL FOR ADDED STRENGTH	LT	240+02.75 TO 240+40.00
✓1	~~100~~ 50	✓37.5	~~✓12.5~~	✓12.5	✓12.5	✓12.5		2 ~~1~~				ADD GUIDE RAIL ELEMENT TO 2-SCC GUIDE RAIL FOR ADDED STRENGTH	RT	240+02.75 TO 240+40.00
✓4	~~200~~ 100	✓100	~~✓50~~	✓75	~~50~~	✓50	✓2	8 ~~6~~				TOTALS		



DISTRICT	COUNTY	ROUTE	SECTION	SHEET
1-0	ERIE	3001	B01	8 OF 9

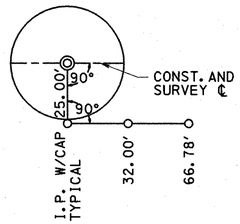
CONNEAUT AND SPRINGFIELD TOWNSHIPS

REVISION NUMBER	REVISIONS	DATE	BY

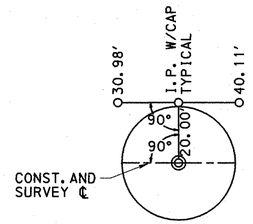
B.M. #1 ELEV. 1002.25
30' RT. STA. 238+45 S.R. 3001
W.I. SPIKE IN 12" OAK

B.M. #2 ELEV. 1000.00
13' RT. STA. 238+61.00 S.R. 3001
PDH DISK IN THE SOUTHEAST ABUTMENT

B.M. #3 ELEV. 989.78
50' LT. STA. 240+25.00 S.R. 3001
W.I. SPIKE IN 10" CRABAPPLE



P.O.T. 236+57.34



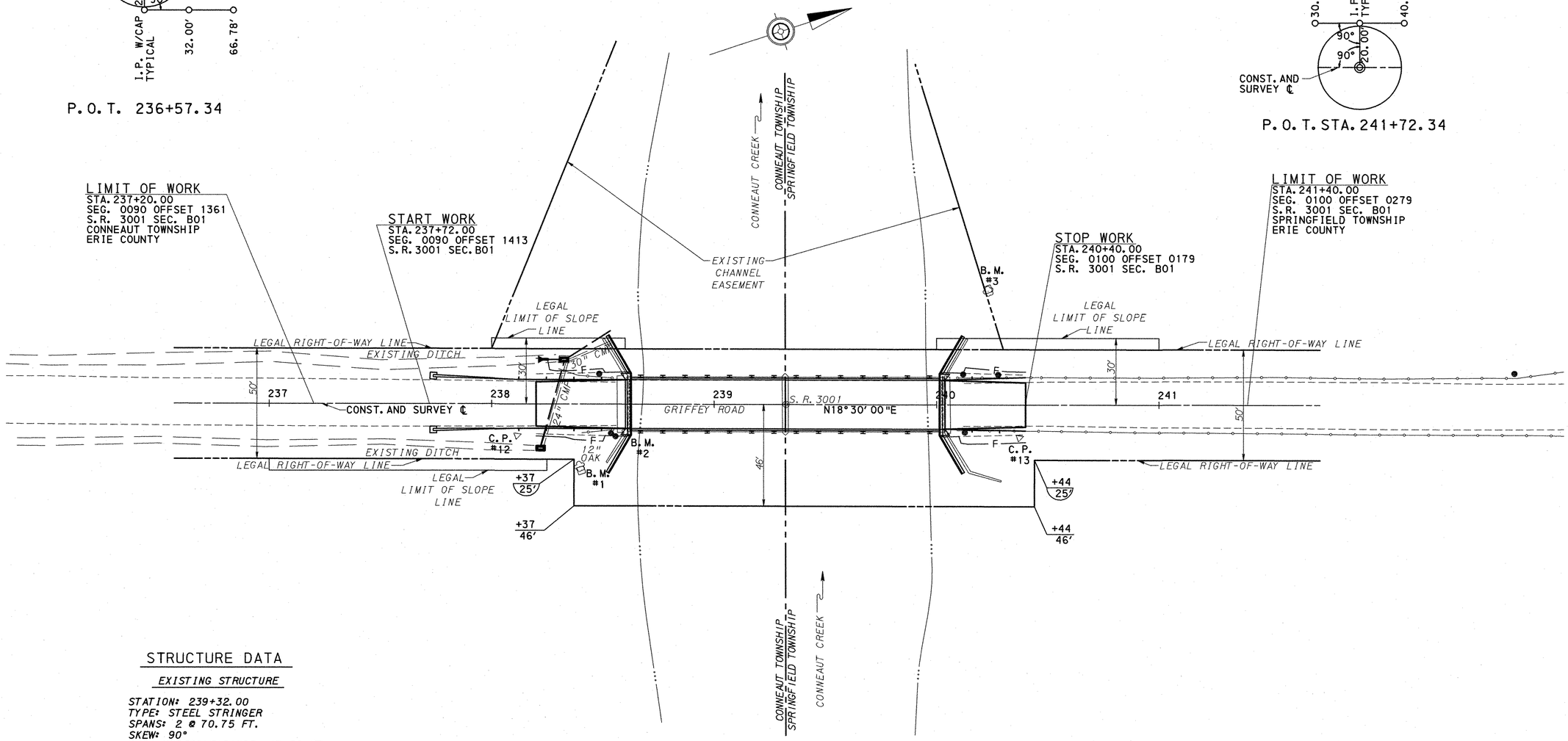
P.O.T. STA. 241+72.34

LIMIT OF WORK
STA. 237+20.00
SEG. 0090 OFFSET 1361
S.R. 3001 SEC. B01
CONNEAUT TOWNSHIP
ERIE COUNTY

START WORK
STA. 237+72.00
SEG. 0090 OFFSET 1413
S.R. 3001 SEC. B01

STOP WORK
STA. 240+40.00
SEG. 0100 OFFSET 0179
S.R. 3001 SEC. B01

LIMIT OF WORK
STA. 241+40.00
SEG. 0100 OFFSET 0279
S.R. 3001 SEC. B01
SPRINGFIELD TOWNSHIP
ERIE COUNTY



STRUCTURE DATA

EXISTING STRUCTURE

STATION: 239+32.00
TYPE: STEEL STRINGER
SPANS: 2 @ 70.75 FT.
SKEW: 90°
AVG. UNDERCLEARANCE: 17.50 FT.
CLEAR ROADWAY WIDTH: 22.00 FT.

PROPOSED STRUCTURE

STATION: 239+32.00
TYPE: STEEL STRINGER
SPANS: 2 @ 70.75 FT.
AVG. UNDER CLEARANCE 17.50 FT.
SKEW: 90°
CLEAR ROADWAY WIDTH: 22.00 FT.
STRUCTURE NO. 29452
RECOMMENDED

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
PAUL A. MILLER
ENGINEER
No. 045191-E

SCALE

HORIZONTAL 0 25 50 FEET

FOR PROFILE, SEE SHEET 9 OF 9

SURVEY BOOK NO. 19929

PLOTTED: 18-MAY-2010 09:21
D-9012 CADD (02-90) REVISED (10-04)
OPERATOR:
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DISTRICT	COUNTY	ROUTE	SECTION	SHEET
1-0	ERIE	3001	B01	9 OF 9

CONNEAUT AND SRINGFIELD TOWNSHIPS

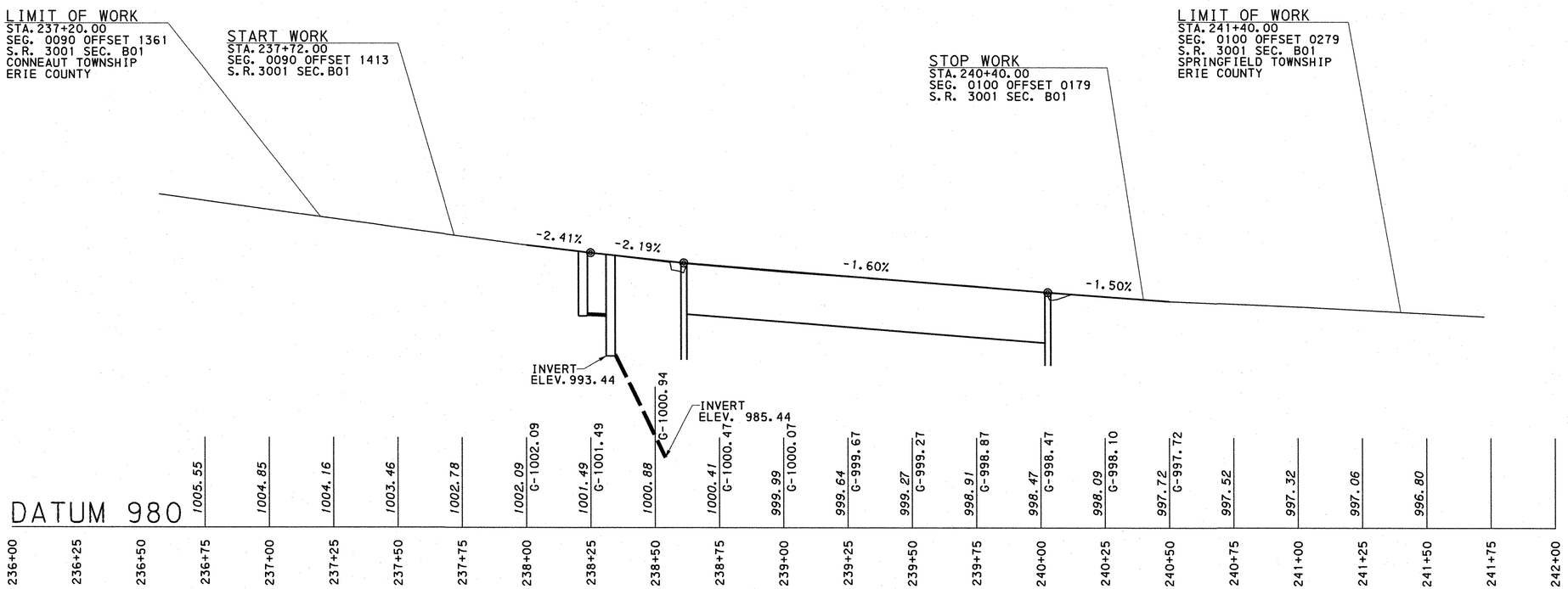
REVISION NUMBER	REVISIONS	DATE	BY

LIMIT OF WORK
STA. 237+20.00
SEG. 0090 OFFSET 1361
S.R. 3001 SEC. B01
CONNEAUT TOWNSHIP
ERIE COUNTY

START WORK
STA. 237+72.00
SEG. 0090 OFFSET 1413
S.R. 3001 SEC. B01

STOP WORK
STA. 240+40.00
SEG. 0100 OFFSET 0179
S.R. 3001 SEC. B01

LIMIT OF WORK
STA. 241+40.00
SEG. 0100 OFFSET 0279
S.R. 3001 SEC. B01
SPRINGFIELD TOWNSHIP
ERIE COUNTY



SCALE

HORIZONTAL 0 25 50 FEET

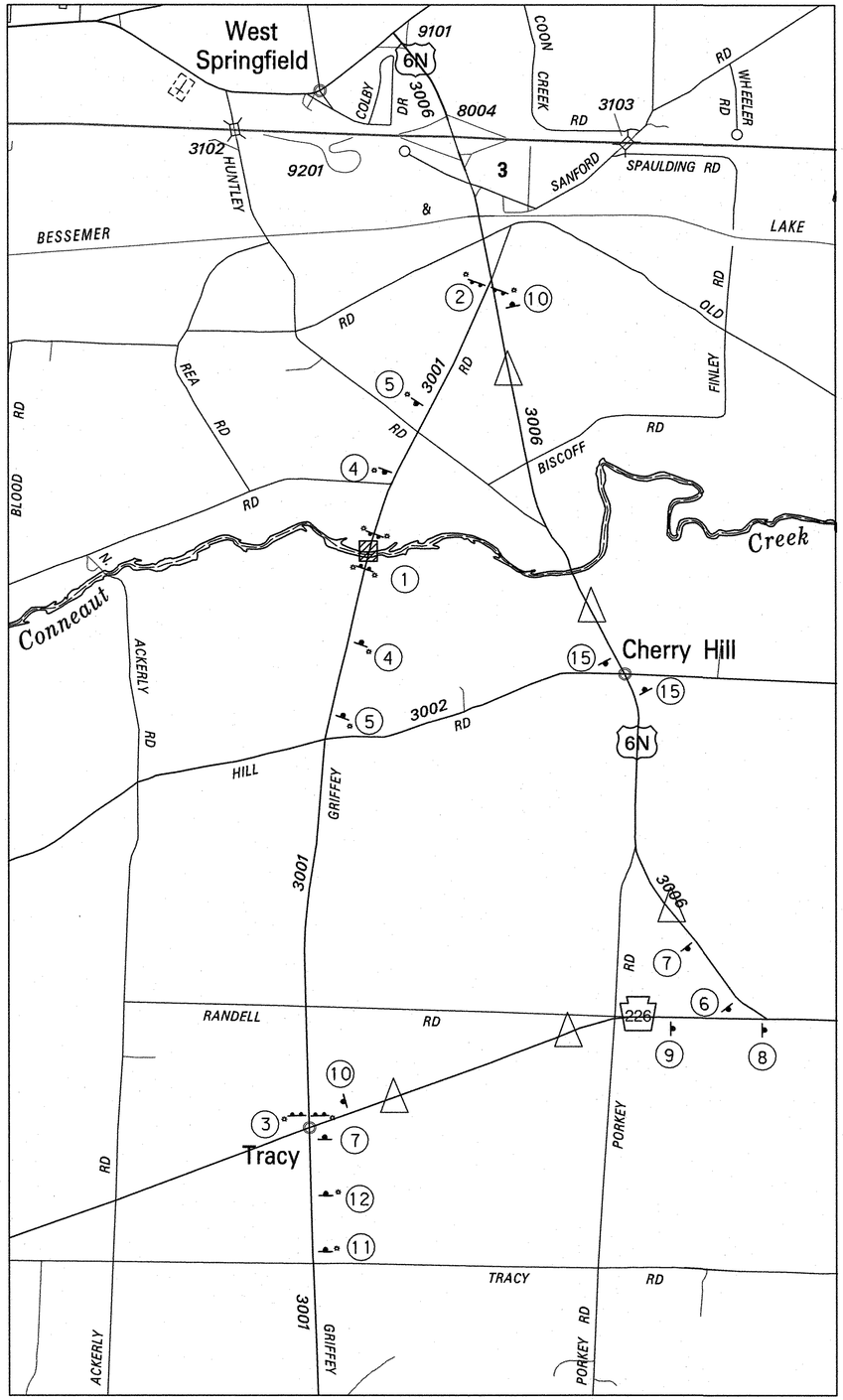
VERTICAL 0 5 10 FEET

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
PAUL A. MILLER
ENGINEER
No. 043191-E

SURVEY BOOK NO. 19929

FOR PLAN, SEE SHEET 8 OF 9

TRAFFIC CONTROL PLAN



TABULATION OF TRAFFIC CONTROL DEVICES

INCLUDED IN ITEM NO. 0901-0001 (FOR INFORMATION ONLY)

SIGN NO.	INSTALLATION MESSAGE	SIGN ASSEMBLY INSTALLATION	QUAN.	ITEMIZED SIGN DESCRIPT'N	SIZE	QUAN.
(1)	ROAD CLOSED **	R11-2 **	2	M4-9S	30X24	2
(2)	ROAD CLOSED, 2 MILES AHEAD, DETOUR LEFT	R11-3A, M4-10L	2	M4-9R	30X24	2
(3)	**ROAD CLOSED, 5 MILES AHEAD, DET. RIGHT**	R11-3A, M4-10R	2	M4-9SR	30X24	2
(4)	**ROAD CLOSED, 500 FEET**	W20-3, W30-1-1	2	M4-9L	30X24	1
(5)	**ROAD CLOSED, 1000 FEET**	W20-3, W30-1-2	2	M4-9SL	30X24	1
(6)	DETOUR, ARROW RIGHT, GRIFFEY ROAD	M4-9R, SP	1	M4-8A	48X30	2
(7)	DETOUR, ADV. ARROW RIGHT, GRIFFEY ROAD	M4-9SR, SP	2	M4-10L	36X12	2
(8)	**DETOUR, ARROW LEFT**, GRIFFEY ROAD	M4-9L, SP	1	M4-10R	36X12	2
(9)	DETOUR, ADV. ARROW LEFT, GRIFFEY ROAD	M4-9SL, SP	1	SP	24X12	9
(10)	**END DETOUR**, GRIFFEY ROAD	M4-8A, SP	2	R11-2	48X30	2
(11)	**DETOUR, 1500 FEET**	W20-2, W30-1-3	1	R11-3A	60X30	4
(12)	DETOUR, 1000 FEET	W20-2, W30-1-2	1	W20-2	36X36	2
(13)	MOTORIST ALERT	W23-1	2	W20-3	36X36	4
(14)	ROAD OPEN TO:	W20-3A	2	W20-3A	48X36	2
(15)	DETOUR, STRAIGHT ARROW, GRIFFEY ROAD	M4-9S, SP	2	W23-1	96X48	2
				W30-1-1	*	2
				W30-1-2	*	3
				W30-1-3	*	1
		TOTAL	25		TOTAL	45
		TYPE III BARRICADES	10			
		TYPE B LIGHTS	14			
*	LEGEND SIZE SHALL BE:					
	5" FOR 36" SIGNS					
	7" FOR 48" SIGNS					

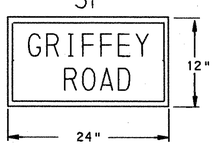
TABULATION OF SEPARATE PAY ITEMS (FOR BOTH SHEETS)

~~0~~ 20	0901 0231 DAY	ADDITIONAL WARNING LIGHTS, TYPE B			
~~125~~ 100	0901 0240 SF	ADDITIONAL TRAFFIC CONTROL SIGNS			

LEGEND

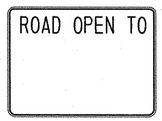
- PROJECT AREA
- TYPE B WARNING LIGHT
- TYPE III BARRICADE
- SIGN POST
- DETOUR ROUTE (CAR/TRUCK)

SP



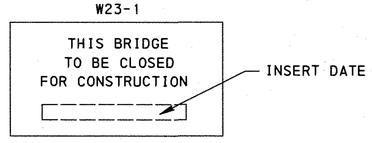
2.0" RADIUS, 0.5" BORDER
BLACK ON ORANGE
"GRIFFEY RD" B

(14)



W20-3A
48" x 36"

(13)
MOTORIST ALERT SIGN
W23-1



96"X48"
BLACK ON ORANGE (REFLECTORIZED)
INSTALL W23-1 MOTORIST ALERT SIGNS 2 WEEKS PRIOR TO CLOSING BRIDGE

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
1-0	ERIE	3001	B01	1 OF 1

CONNEAUT/SPRINGFIELD TOWNSHIP

GENERAL NOTES

THIS WORK CONSISTS OF THE MAINTENANCE OF TRAFFIC AND THE PROTECTION OF THE TRAVELING PUBLIC APPROACHING THE CONSTRUCTION AREA AND WITHIN THE LIMITS OF CONSTRUCTION.

FURNISH, ERECT, PLACE AND MAINTAIN TRAFFIC CONTROL SIGNS AND DEVICES AND MAINTAIN TRAFFIC DURING HOURS OF CONSTRUCTION AND AT ALL OTHER TIMES IN ACCORDANCE WITH THE METHODS INDICATED ON THESE DRAWINGS, AND,

1. THE SPECIAL PROVISIONS OF THE CONTRACT.
2. MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
3. TITLE 67 PA. CODE CHAPTER 212, OFFICIAL TRAFFIC CONTROL DEVICES.
4. TITLE 67 PA. CODE CHAPTER 213, TEMPORARY WORK ZONE TRAFFIC CONTROL GUIDELINES.
5. PDT PUBLICATION NO. 35, APPROVED CONSTRUCTION MATERIALS (BULLETIN 15).
6. PDT PUBLICATION NO. 408, SPECS. (DATED 2007)
7. PDT PUBLICATION NO. 46, TRAFFIC ENGINEERING MANUAL.

IMMEDIATELY UPON COMPLETION OF THE WORK, REMOVE THE DEVICES. THE DEPARTMENT WILL REMOVE ANY TRAFFIC CONTROL DEVICES ERECTED BY DEPARTMENT FORCES. ALL SIGNS ARE TO BE IN NEW OR "LIKE NEW" CONDITION.

THE ENGINEER WILL INSPECT ALL TRAFFIC CONTROL DEVICES PRIOR TO START OF WORK.

COVER OR REMOVE ALL SIGNS NOT IN USE.

INSTALL W23-1 "MOTORIST ALERT SIGNS" TWO WEEKS PRIOR TO ROAD CLOSURE.

INSTALL W20-3A "ROAD OPEN TO" AS DIRECTED BY ENGINEER.

** PROVIDE A SUFFICIENT QUANTITY OF TYPE III BARRICADES TO EXTEND THE FULL WIDTH OF THE CLOSURE.

COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PROFESSIONAL RANDALL A. BRUNE ENGINEER No. 040460 PENNSYLVANIA

Randall A Brune

RECOMMENDED MAY 05 2010
Randall A Brune
DISTRICT TRAFFIC ENGINEER

TRAFFIC CONTROL PLAN

GENERAL NOTES

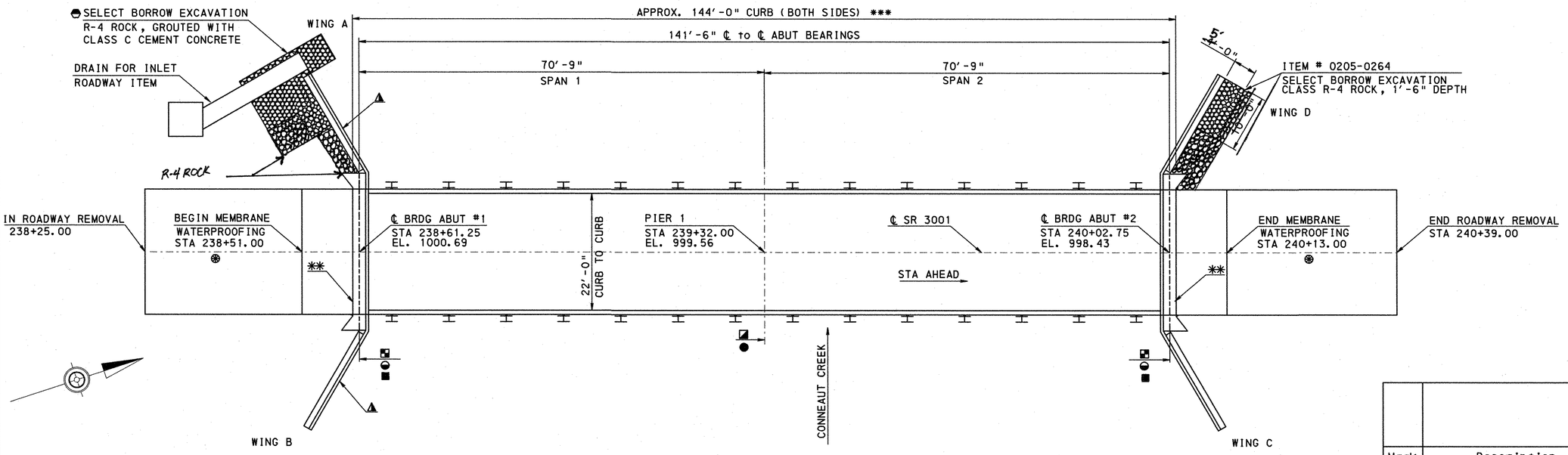
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION SPECIFICATIONS PUBLICATION 408/2007 INCLUDING CURRENT SUPPLEMENTS AND CONTRACT SPECIAL PROVISIONS.
2. AASHTO, LRFD BRIDGE DESIGN SPECIFICATIONS, 3RD EDITION, 2004 AND AS SUPPLEMENTED BY DESIGN MANUAL PART 4, SEPTEMBER 2007 EDITION (INCLUDING REVISIONS)
3. PROVIDE (GRADE 60) REINFORCING STEEL BARS THAT MEET THE REQUIREMENTS OF ASTM A 615/A 615M-96a. DO NOT WELD (GRADE 60) REINFORCING STEEL BARS UNLESS SPECIFIED. (GRADE 40) REINFORCING STEEL BARS MAY BE SUBSTITUTED WITH A PROPORTIONAL INCREASE IN CROSS-SECTIONAL AREA, IF APPROVED BY THE CHIEF BRIDGE ENGINEER. DO NOT USE RAIL STEEL A 616/A 616M-96a REINFORCEMENT BARS IN BRIDGE PIERS, ABUTMENTS, SHEAR BLOCKS, BEAMS, FOOTINGS, PILES, PARAPETS OR WHERE BENDING OR WELDING OF THE REINFORCEMENT BARS IS INDICATED.
4. PROVIDE 2" CONCRETE COVER ON REINFORCEMENT BARS EXCEPT AS NOTED.
5. WELDING OF REINFORCEMENT BARS DURING FABRICATION OR CONSTRUCTION WILL NOT BE PERMITTED UNLESS SPECIFIED OR PERMITTED BY THE BRIDGE ENGINEER.
6. USE EPOXY BONDING COMPOUND WHEREVER CAST-IN-PLACE CEMENT CONCRETE COMES IN CONTACT WITH EXISTING CEMENT CONCRETE. THE EPOXY BONDING COMPOUND IS TYPE 2, GRADE 2 AS DESCRIBED IN ASTM-C881-78.
7. CHAMFER EXPOSED CONCRETE EDGES 1" X 1" EXCEPT AS NOTED.
8. THE CONTRACTOR IS RESPONSIBLE FOR ANY FORMING NECESSARY FOR PROPER FIT OF THE PROPOSED CONSTRUCTION. (EXAMPLES: PIER ENCASEMENT AND SEALING OPEN JOINTS WITH NON-SHRINK GROUT).
9. REPAIR ANY AREAS DAMAGED BEYOND THE REMOVAL LIMITS AT NO EXPENSE TO THE DEPARTMENT.
10. UTILITY NOTES:
    COORDINATE, LOCATE AND CONDUCT ALL WORK RELATED TO PUBLIC AND PRIVATE UTILITIES IN ACCORDANCE WITH PUBLICATION 408/2007, SECTIONS 105.06 AND 107.12. VERIFY AND LOCATE ALL EXISTING UTILITIES PRIOR TO STARTING WORK, AND CONDUCT OPERATIONS IN A MANNER WHICH ENSURES THE UTILITIES WILL NOT BE DISTURBED OR ENDANGERED AND ASSUME FULL RESPONSIBILITY FOR ANY DAMAGE TO UTILITIES DURING CONSTRUCTION. THE DEPARTMENT DOES NOT ASSUME RESPONSIBILITY FOR REIMBURSEMENT, PARTICIPATION IN DESIGN AND/OR REVISIONS OR LIABILITY FOR ACCURACY OF TYPE, SIZE AND LOCATION OF ANY UTILITY. COORDINATE THE REQUIREMENTS FOR PROTECTION AND/OR RELOCATION OF UTILITIES WITH THE UTILITY OWNER PRIOR TO STARTING WORK.
11. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND GEOMETRY OF THE EXISTING STRUCTURE IN THE FIELD (PRIOR TO FABRICATION) AS NECESSARY FOR PROPER FIT AND OF THE PROPOSED CONSTRUCTION.
12. THE EXISTING STRUCTURAL MEMBERS CONTAIN LEAD BASED PAINT AND OTHER TOXIC MATERIALS.

INDEX OF DRAWINGS

SHEET NUMBER	TITLE
1	GENERAL PLAN & GENERAL NOTES
2	QUANTITIES
3	REMOVAL DETAILS
4	ABUTMENT DETAILS
5	STRUCTURE FOUNDATION DRAIN DETAILS
6	PIER ENCASEMENT DETAILS
7	BRIDGE PRESERVATION DETAILS

SUPPLEMENTAL DRAWINGS

DESCRIPTION	DWG. NO.	APP. DATE
REINFORCEMENT BAR FABRICATION DETAILS	BC-736M	1-21-03
BRIDGE DRAINAGE	BC-751M	12-29-08
REINFORCED CONCRETE REPAIR	BC-783M	7-20-07
TYP. WATERPROOFING AND EXPANSION DETAILS	BC-788M	1-21-03
BACKFILL AT STRUCTURES	RC-12M	3-30-06
SUBSURFACE DRAINS	RC-30M	8-29-08
CLASSIFICATION OF EARTHWORK FOR STRUCTURRES	RC-11M	4-15-04



GENERAL PLAN

5 0 5 10 FEET

- ITEM NO. 9003-0001 DOWEL HOLES, 60" DEPTH
  ITEM NO. 1002-0053 REINFORCEMENT BARS, EPOXY COATED
  DRILL DOWEL HOLE THROUGH EXISTING DIAPHRAMS INTO EXISTING ABUTMENT. PLACE DOWELS AND FILL HOLE WITH NON-SHRINK GROUT. SEE DETAIL ON SHEET 4 OF 7.
- ITEM NO. 1018-0050
  REMOVE DECK AND AT PIER
  AS SHOWN ON SHEET 3 OF 7.
  ITEM NO. 1003-0008
  DRILL HOLES IN PIER CAP AND INSTALL DOWELS
  AS SHOWN ON SHEET 6 OF 7
  ITEM NO. 1002-0053
  INSTALL REINFORCEMENT BARS THROUGH BEAMS
  AS SHOWN ON SHEET 6 OF 7.
  ITEM NO. 9000-0500
  ENCASE PIER AND BEAMS WITH CLASS AA CEMENT WITH NO. 8 COURSE AGGREGATE TYPE A AND FIBERS FROM TOP OF EXISTING DECK.
  AS SHOWN ON SHEET 6 OF 7.
- ITEM NO. 9071-0001
  SPOT/ZONE MAINTENANCE PAINTING OF EXISTING STRUCTURAL STEEL (SEE SPECIAL PROVISION)
  ITEM NO. 9073-0010
  DISPOSAL OF BRIDGE WASTE (SEE SPECIAL PROVISION)
  ITEM NO. 9075-0010
  CONTAINMENT (SEE SPECIAL PROVISION)
  ITEM NO. 9077-0010
  WORKER HEALTH AND SAFETY (SEE SPECIAL PROVISION)
- ** ITEM NO. 4680-0121
  INSTALL MEMBRANE WATERPROOFING AS SHOWN ON SHEET 5 OF 7.
- ITEM NO. 1001-0611
  ITEM NO. 0615-0040 (ROADWAY)
  ITEM NO. 0615-0066 (ROADWAY)
  SEE STRUCTURE FOUNDATION DRAIN DETAILS SHEET 5 OF 7 FOR DETAILS
- *** ITEM NO. 1056-0100
  WELD 4" X 3/8" PLATE TO EXISTING METAL CURB.
  SEE SHEET 7 OF 7
- ITEM NO. 4680-0120
  LIMITS OF MEMBRANE WATERPROOFING FOR DECK
- ITEM NO. 1001-0020 & ITEM NO. 0205-0264
  FILL ERODED VOID BEHIND WING WITH R-4 ROCK AND GROUT IN PLACE WITH CLASS C CEMENT CONCRETE.
  SEE SHEET 4 OF 7
- ITEM NO. 0515-0001
  -SAWING AND SEALING OF BITUMINOUS OVERLAY
  ON SHEET 7 OF 7
- ITEM NO. 1001-0010
  FILL CRACK IN WING WITH CLASS A CEMENT CONCRETE.
  ON SHEET 4 OF 7

Mark	Description	By	Chk'd.	Recm'd.	Date
REVISIONS					

S.R. 3001 PREVIOUSLY KNOWN AS L.R. 25001

PREPARED BY
DISTRICT 1-0
BRIDGE UNIT

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
WILLIAM C. KOLLER
ENGINEER
No. 037389-E

RECOMMENDED 5/10/2010
William C. Koller, P.E.
DISTRICT BRIDGE ENGINEER

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

ERIE COUNTY
S.R. 3001, SEC B01
SEGMENT 0100, OFFSET 0000
S.R. 3001-B01, STA 239+32.00
OVER CONNEAUT CREEK
STRUCTURE REHABILITATION
GENERAL PLAN & NOTES

SHEET 1 OF 7
+ SUPPLEMENTAL DRAWINGS
S - 29452

DES: REB | DWG: DMB. | CKD: REB

ECMS # 82921
BMS # 25-3001-0100-0000

ERIE CO., S.R. 3001 - SEC. B01
TABULATION OF BRIDGE BID ITEMS & APPROXIMATE QUANTITIES

QUANTITY	ITEM NUMBER / UNIT	DESCRIPTION	ABUT. #1	PIER #1	ABUT. #2	SUPERST.
~~44.566~~ 53	0204 0100 CY	CLASS 3 EXCAVATION	31		28	
~~29.861~~ 24	0205 0264 CY	SELECTED BORROW EXCAVATION ROCK, CLASS R-4	21		3	
~~16.25~~ 18	0205 0285 CY	SELECTED BORROW EXCAVATION COARSE AGGREGATE NO. 57	9		9	
✓44	0515 0001 LF	SAWING AND SEALING OF BITUMINOUS OVERLAY	22		22	
~~0.875~~ 1	1001 0010 CY	CLASS A CEMENT CONCRETE	~~.875~~ 1			
~~2.148~~ 2	1001 0020 CY	CLASS C CEMENT CONCRETE	~~2.148~~ 2			
~~68.0~~ 72	1001 0611 LF	6" STRUCTURE FOUNDATION DRAIN	36		~~32~~ 36	
~~32.0~~ 42	1001 0730 CY	SELECTED BORROW EXCAVATION STRUCTURE BACKFILL	23		19	
~~910.0~~ 943	1002 0053 LB	REINFORCEMENT BARS, EXPOXY COATED	97	719	97	
✓12	1003 0008 EA	DOWEL HOLES, 18" DEPTH		12		
✓LS	1018 0050 LS	REMOVAL OF PORTION OF EXISTING BRIDGE (A)				
~~1479.0~~ 1469	1056 0100 LB	FABRICATED STRUCTURAL STEEL				1469
~~405.778~~ 408	4680 0120 SY	MEMBRANE WATERPROOFING SYSTEM INSTALLED ON BRIDGE DECK MODIFIED (A)				408
~~19.556~~ 20	4680 0121 SY	MEMBRANE WATERPROOFING SYSTEM INSTALLED ON OTHER SURFACES MODIFIED (A)	~~9.778~~ 10		~~9.778~~ 10	
~~25.25~~ 24	9000 0500 LF	PIER JOINT ENCASEMENT (A)		24		
✓24	9003 0001 EA	DOWEL HOLES, 60" DEPTH (A)	✓12		✓12	
✓LS	9071 0001 LS	SPOT/ZONE MAINTENANCE PAINTING OF EXISTING STRUCURAL STEEL (A)				
✓LS	9073 0010 LS	DISPOSAL OF BRIDGE WASTE (A)				
✓LS	9075 0010 LS	CONTAINMENT (A)				
✓LS	9077 0010 LS	WORKER HEALTH AND SAFETLY (A)				
3458.34	9999 0101 DOLLA	PIER CAP AND STEEL DIAPHRAGM REMOVAL				

LEGEND

(A) - SEE SPECIAL PROVISIONS

Mark	Description	By	Chk'd.	Recm'd.	Date
REVISIONS					

S.R. 3001 PREVIOUSLY KNOWN AS L.R. 25001

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

ERIE COUNTY
S.R. 3001, SEC B01
SEGMENT 0100, OFFSET 0000
S.R. 3001-B01, STA 239+32.00
OVER CONNEAUT CREEK
STRUCTURE REHABILITATION
QUANTITIES

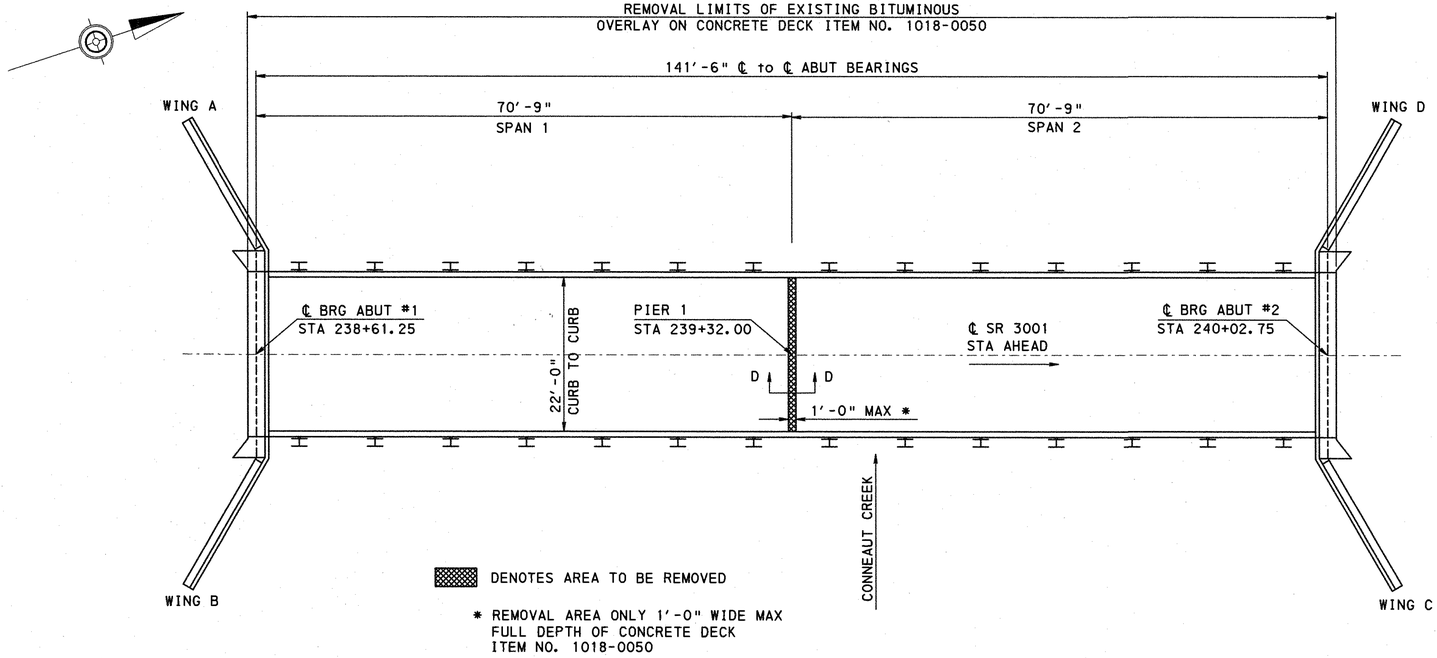
COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL WILLIAM C. KOLLER ENGINEER No. 037389-E

RECOMMENDED 5/10/2010

SHEET 2 OF 7

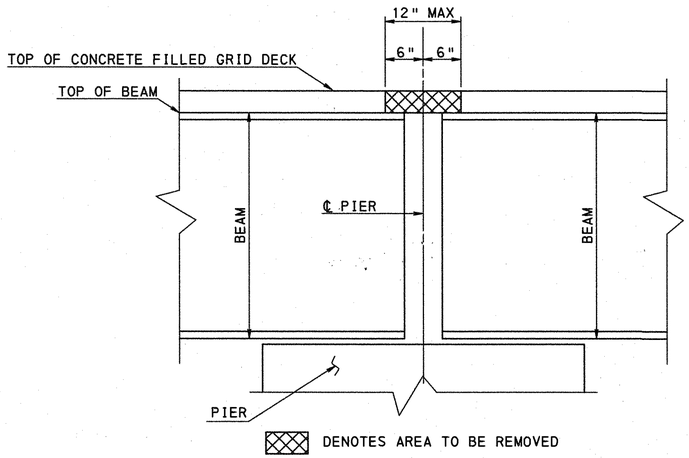
S - 29452

DES: REB | DWG: DMB | CKD: REB



REMOVAL PLAN

5 0 5 10 FEET



SECTION D-D

6 0 6 12 INCHES

Mark	Description	By	Chk'd.	Recm'd.	Date
REVISIONS					

S.R. 3001 PREVIOUSLY KNOWN AS L.R. 25001

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

ERIE COUNTY
S.R. 3001, SEC B01
SEGMENT 0100, OFFSET 0000
S.R. 3001-B01, STA 239+32.00
OVER CONNEAUT CREEK
STRUCTURE REHABILITATION
REMOVAL PLAN

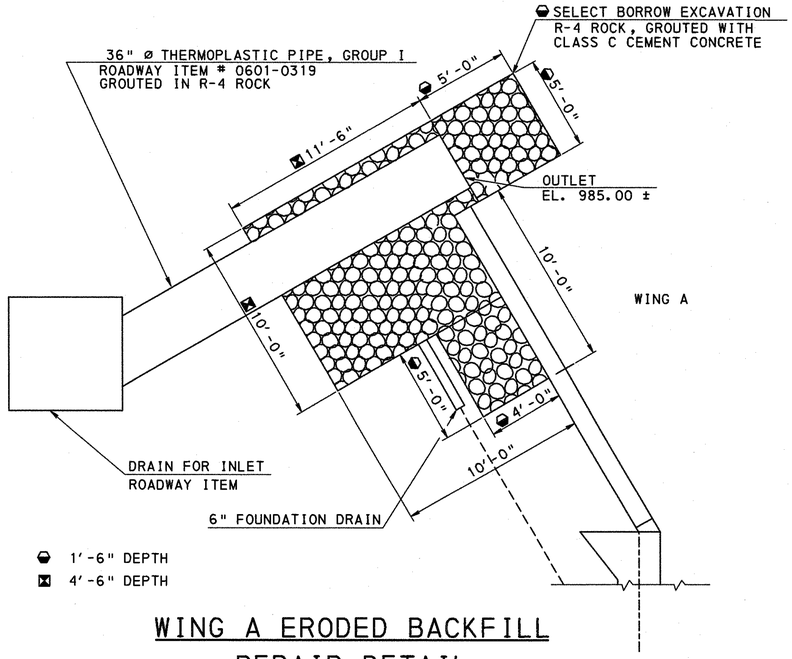
COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL WILLIAM C. KOLLER ENGINEER No. 037399-E

RECOMMENDED 5/10/2010

SHEET 3 OF 7

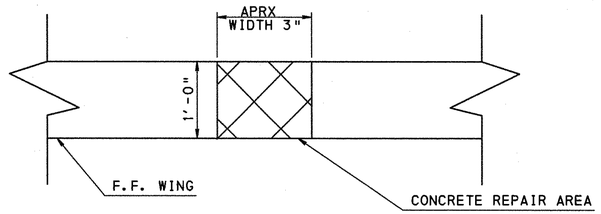
S - 29452

DES: REB | DWG: DMB | CKD: REB



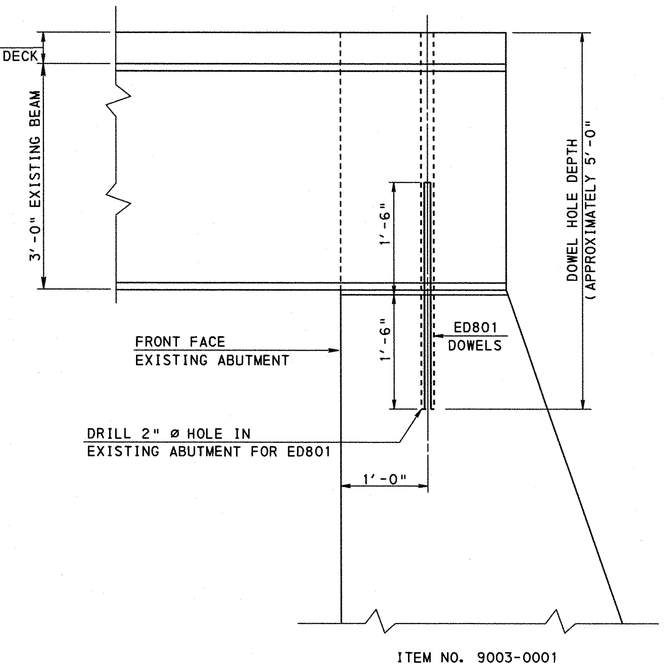
WING A ERODED BACKFILL REPAIR DETAIL

2 0 2 4 FEET



SECTION A-A

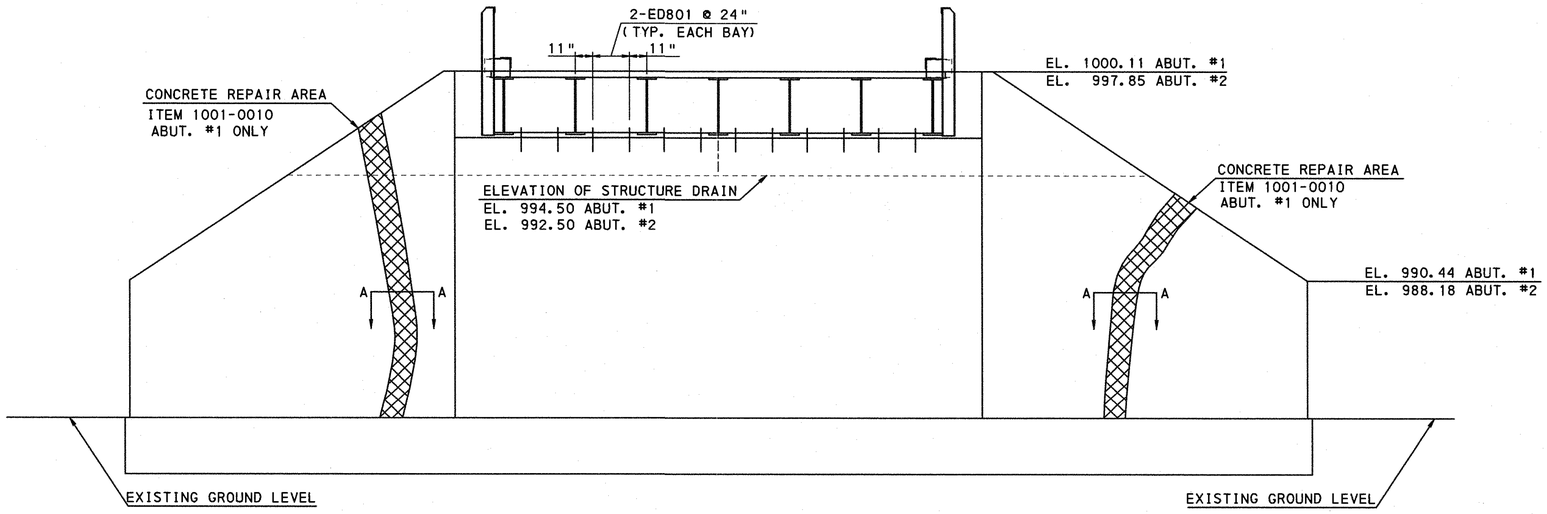
6 0 6 12 INCHES



ITEM NO. 9003-0001

ABUTMENT DOWEL DETAIL

NO SCALE



TYPICAL ABUTMENT ELEVATION

2 0 2 4 FEET

Mark	Description	By	Chk'd.	Recm'd.	Date
	REVISIONS				

S.R. 3001 PREVIOUSLY KNOWN AS L.R. 25001

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

ERIE COUNTY
S.R. 3001, SEC B01
SEGMENT 0100, OFFSET 0000
S.R. 3001-B01, STA 239+32.00
OVER CONNEAUT CREEK
STRUCTURE REHABILITATION
ABUTMENT DETAILS

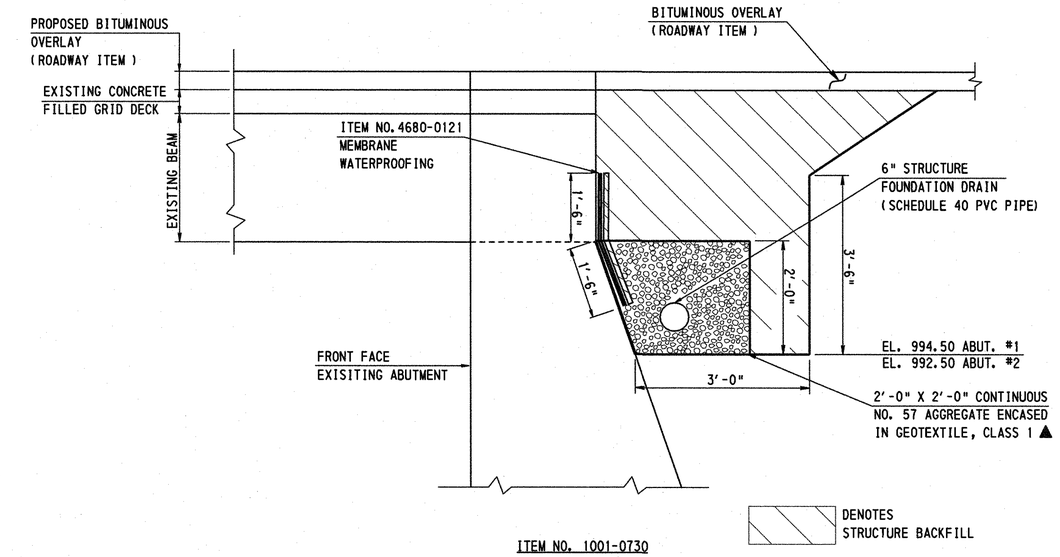
COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL WILLIAM C. KOLLER ENGINEER No. 037389-E

RECOMMENDED 5/10/2010

SHEET 4 OF 7

S - 29452

DES: REB | DWG: DMB | CKD: REB

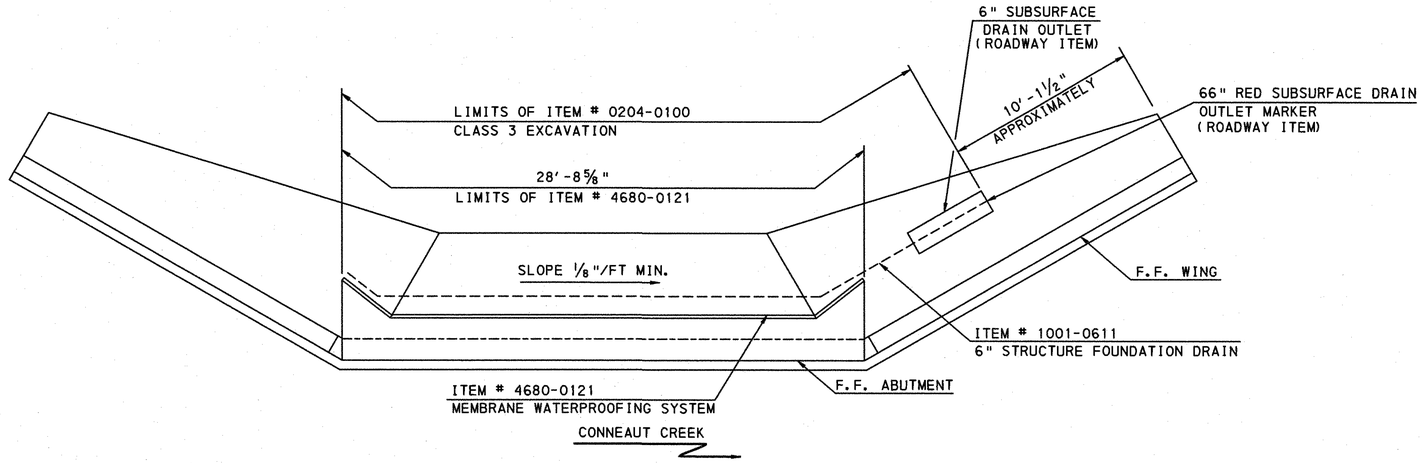


ITEM NO. 1001-0730

TYPICAL STRUCTURE BACKFILL LIMITS AT ABUTMENTS

NO SCALE

▲ GEOTEXTILE IS INCIDENTAL TO THE COST OF NO. 57 AGGREGATE



6" STRUCTURE FOUNDATION DRAIN

ABUTMENT #1 SHOWN ABUTMENT #2 SIMILAR

2 0 2 4 FEET

Mark	Description	By	Chk'd.	Recm'd.	Date
REVISIONS					

S.R. 3001 PREVIOUSLY KNOWN AS L.R. 25001

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

ERIE COUNTY
S.R. 3001, SEC B01
SEGMENT 0100, OFFSET 0000
S.R. 3001-B01, STA 239+32.00
OVER CONNEAUT CREEK
STRUCTURE REHABILITATION

STRUCTURE FOUNDATION DRAIN DETAIL

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER WILLIAM C. KOLLER No. 037389-E

RECOMMENDED 5/10/2010

SHEET 5 OF 7

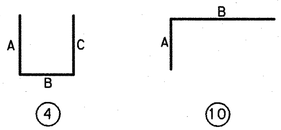
S - 29452

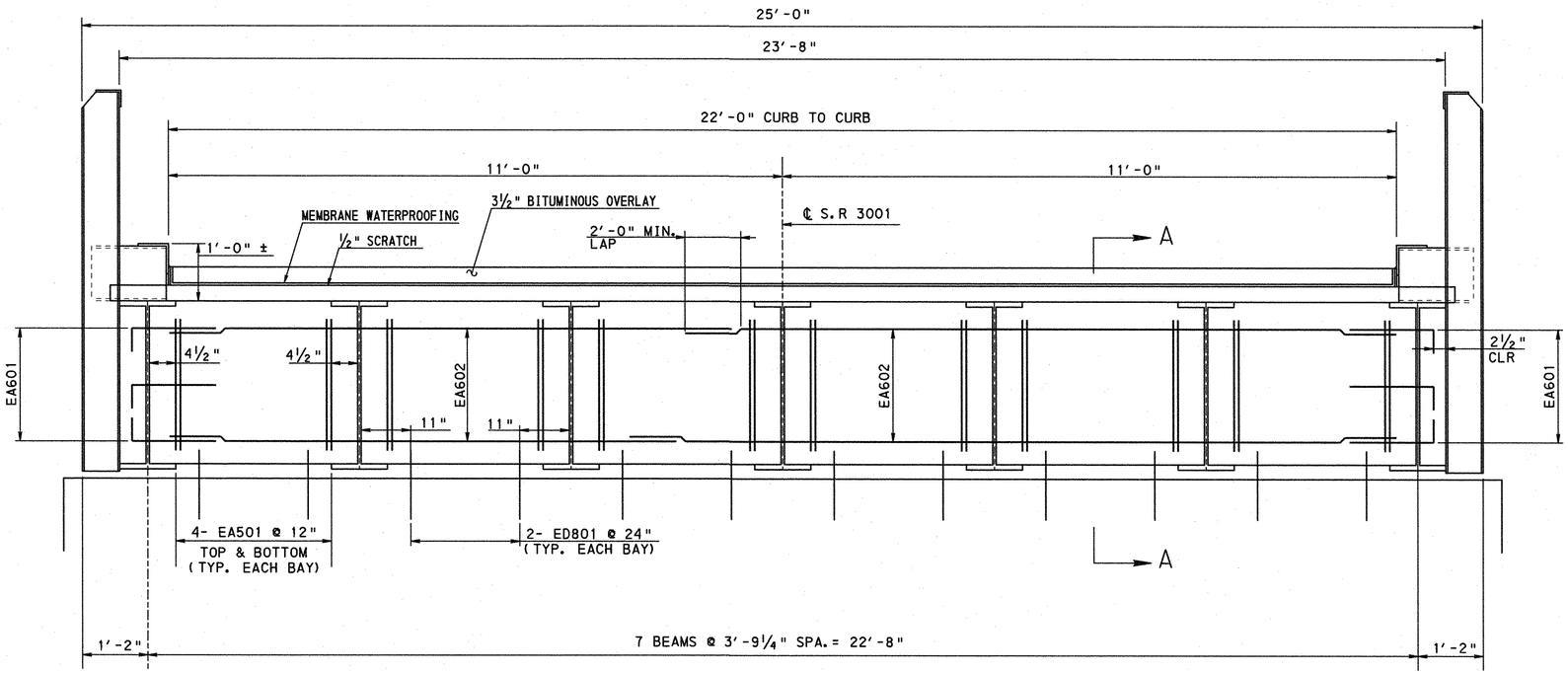
DES: REB | DWG: DMB | CKD: REB

OPERATOR:
FILE NAME: F:\br8\Erie\25-3001-0100-0000\Drawings\Sheets\FOUNDATION DRAIN.dgn

STRUCTURE REHABILITATION REINFORCEMENT BAR SCHEDULE

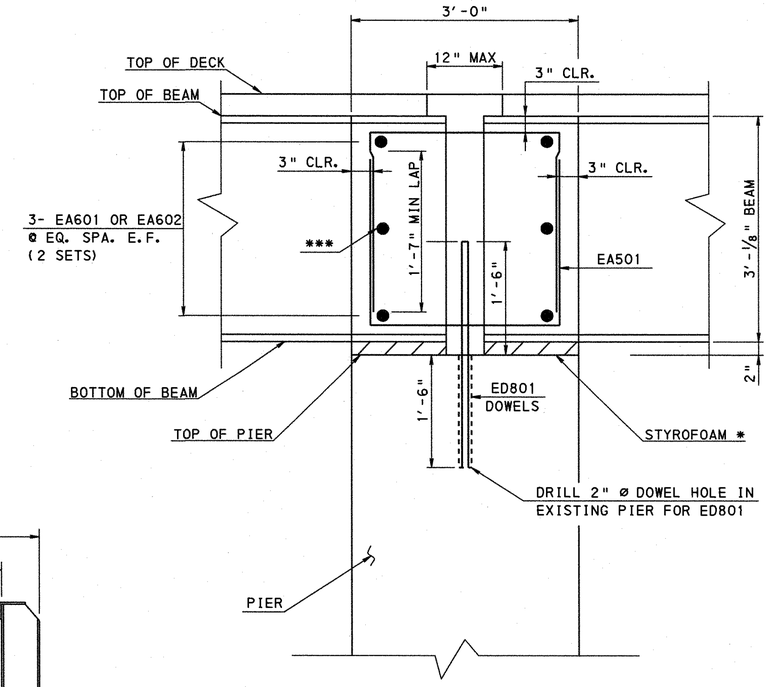
MARK	SIZE	NUMBER	LENGTH	TYPE	A	B	C	D	E	R	REMARKS
EA501	5	48	6'-6"	4	2'-0"	2'-6"	2'-0"				
EA601	6	12	4'-0"	10	1'-0"	3'-0"					
EA602	6	12	12'-6"	STR							
ED801	8	36	3'-0"	STR							





PROPOSED PIER ENCASEMENT ELEVATION

12 0 12 INCHES



*** DRILL 2" ø HOLE IN BEAM WEB FOR EA601 OR EA602 BARS
3 HOLES REQUIRED IN EACH BEAM (TYP.)

* PLACE SYROFOAM AROUND EDGES OF BEAMS
TO KEEP CONCRETE AWAY FROM BEARING PADS.

SECTION A-A

6 0 6 12 INCHES

Mark	Description	By	Chk'd.	Recm'd.	Date
REVISIONS					

S.R. 3001 PREVIOUSLY KNOWN AS L.R. 25001

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

ERIE COUNTY
S.R. 3001, SEC B01
SEGMENT 0100, OFFSET 0000
S.R. 3001-B01, STA 239+32.00
OVER CONNEAUT CREEK
STRUCTURE REHABILITATION
PIER ENCASEMENT DETAILS

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
WILLIAM C. KOLLER
ENGINEER
No. 037399-E

RECOMMENDED 5/10/2010

SHEET 6 OF 7

S - 29452

DES: REB | DWG: DMB | CKD: REB

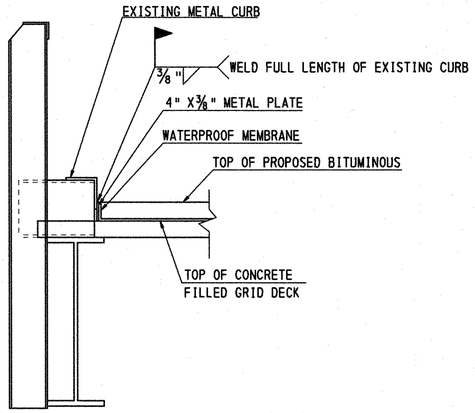
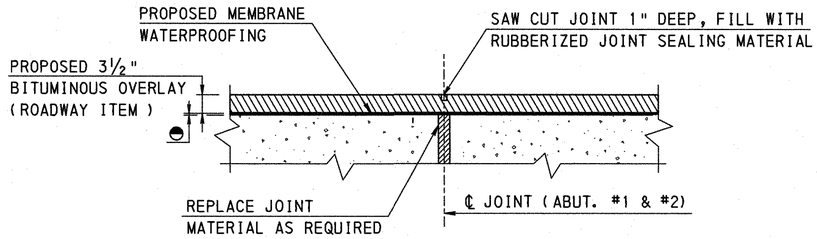


PLATE DETAIL

12 0 12 INCHES



ITEM NO. 0515-0001

TYPICAL SAW CUT JOINT

NO SCALE

◓ 1/2" HMA WEARING COURSE
(SCRATCH), AS DESIGNED.
(ROADWAY ITEM)

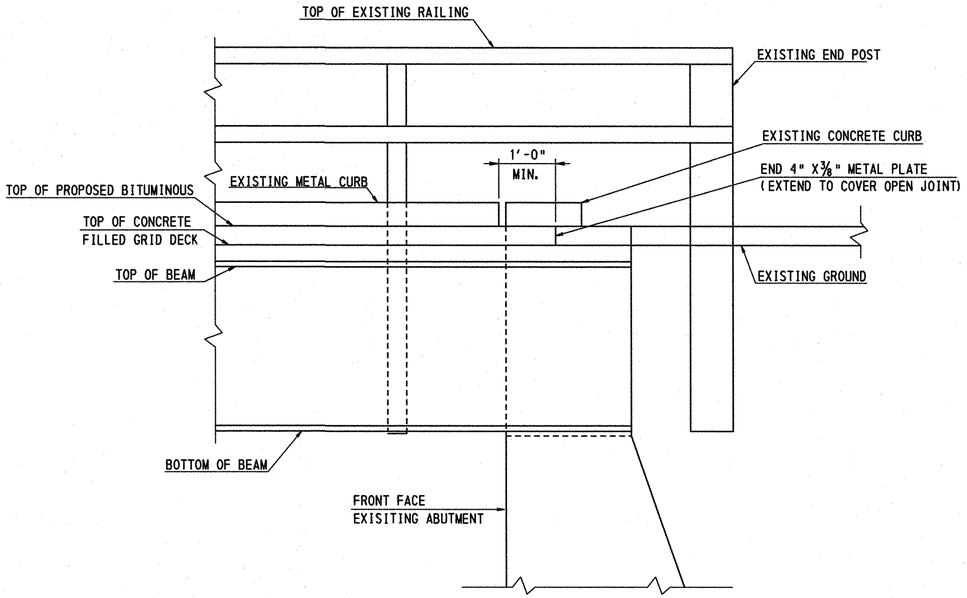


PLATE DETAIL ELEVATION

12 0 12 INCHES

Mark	Description	By	Chk'd.	Recm'd.	Date
	REVISIONS				

S.R. 3001 PREVIOUSLY KNOWN AS L.R. 25001

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

ERIE COUNTY
S.R. 3001, SEC B01
SEGMENT 0100, OFFSET 0000
S.R. 3001-B01, STA 239+32.00
OVER CONNEAUT CREEK
STRUCTURE REHABILITATION
BRIDGE PRESERVATION DETAILS

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
WILLIAM C. KOLLER
ENGINEER
No. 037389-E

RECOMMENDED 5/10/2010

SHEET 7 OF 7

S - 29452

DES: REB | DWG: DMB | CKD: REB

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
1-0	ERIE	3001	B01	1 OF 4
CONNEAUT AND SPRINGFIELD TOWNSHIPS				

PLOTTED: 18-MAY-2010 09:23

ERIE COUNTY
S.R. 3001 SECTION B01

STA. 237+20.00 TO STA. 241+40.00
SEG. 0090 OFFSET 1361 TO SEG. 0100 OFFSET 0279
S.R. 3001 SEC. B01 (LIMITS OF WORK)

CROSS SECTIONS

SHEETS 2 THRU 4
TOTAL SHEETS 4

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
PAUL A. MILLER
ENGINEER
No. 043191-E

OPERATOR:
FILE NAME: G:\vds10\E3001B01\Inroads\E3001B012d.dgn

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION

CROSS SECTIONS

SCALE: 1 INCH = 5 FEET

Dist.	County	Route	Sect.	Prelim. Bk. No.	Final Bk. No.	Sheet No.
1-0	ERIE	3001	B01			2 OF 4

80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80

℄

24" THERMOPLASTIC PIPE
WITH END SECTION CONNECT
TO DITCH AND PROPOSED
TYPE S INLET STA. 238+22.00 LT.

GUIDE RAIL

E-1000.90 Off -13.81
E-1001.11 Off -10.31
E-1001.31 Off 0.00
E-1001.11 Off 10.31
E-1000.90 Off 13.81

0.06 0.02 0.02 0.06

INVERT
ELEV. 995.54

SLOPE 1.0%

INVERT
ELEV. 995.00

INVERT
ELEV. 993.44

36" THERMOPLASTIC PIPE
CONNECT TO PROPOSED
TYPE S INLET AND OUTLET
PAST WINGWALL INTO GROUTED ROCK.
OUTLET INVERT ELEV. 985.44

STA. 238+28.50 REMOVE EXISTING
24" CMP AND REPLACE WITH
24" RCP CONNECT TO PROPOSED
DH INLET STA. 238+22.00 RT. AND
TYPE S INLET STA. 238+32.59 LT.

PRELIMINARY			
C.	29.32	F.	0.00
FINAL			
C.		F.	
T.C.		T.F.	

238+32.79

GUIDE RAIL

E-1001.07 Off -13.62
E-1001.28 Off -10.12
E-1001.48 Off 0.00
E-1001.28 Off 10.12
E-1001.07 Off 13.62

0.06 0.02 0.02 0.06

REMOVE EXISTING 24" CMP
REPLACE WITH PROPOSED 24" RCP
STA. 238+28.00

REMOVE EXISTING INLET RT.
REPLACE WITH PROPOSED DH INLET
STA. 238+22.00

PRELIMINARY			
C.	29.81	F.	0.00
FINAL			
C.		F.	
T.C.		T.F.	

238+25.00

GUIDE RAIL

E-1000.67 Off -13.50
E-1000.96 Off -10.00
E-1001.60 Off -0.00
E-1001.32 Off 10.00
E-1000.84 Off 13.50

BEGIN FULL DEPTH RECONSTRUCTION
MATCH EXISTING PAVEMENT
STA. 238+20.00

START WORK
BEGIN GUIDE RAIL LT. & RT.
STA. 237+72.00

LIMIT OF WORK
STA. 237+20.00

PRELIMINARY			
C.	34.50	F.	0.00
FINAL			
C.		F.	
T.C.		T.F.	

238+20.00

1010 1005 1000 995 990 985 1005 1000 995 990 1010 1005 1000 995 990

40 30 20 10 0 10 20 30 40 30 20 10 0 10 20 30 40

PLOTTED: 18-MAY-2010 09:23

OPERATOR:
FILE NAME: G:\ds10\E3001B01\Inroads\E3001B012d.dgn

Finals Plotted By	
Finals Checked By	
Area By	
Area Checked By	
Original Checked By	
Template By	
Area By	
Application No.	
Route No.	
Original Plotted By	

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION

CROSS SECTIONS

SCALE: 1 INCH = 5 FEET

Distr.	County	Route	Sect.	Prelim. Bk. No.	Final Bk. No.	Sheet No.
1-0	ERIE	3001	B01			3 OF 4

PLOTTED: 18-MAY-2010 09:23

OPERATOR:
FILE NAME: G:\ds10\E3001B01\Inroads\E3001B012d.dgn

Finals Plotted By
Finals Checked By
Area By
Area Checked By
Original Checked By
Template By
Area By
Application No.
Route No.
Original Plotted By

80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80

1010
1005
1000
995
990
985
980

E-1000.47 Off -11.00 | E-1000.69 Off 0.00 | E-1000.47 Off 11.00

0.02 0.02

BEGIN STRUCTURE
STA. 238+61.25

PRELIMINARY			
C.	0.00	F.	0.00
FINAL			
C.		F.	
T.C.		T.F.	

238+61.25

GUIDE RAIL

E-1000.51 Off -14.23 | E-1000.72 Off -10.73 | E-1000.94 Off 0.00 | E-1000.72 Off 10.73 | E-1000.51 Off 14.23

0.06 0.02 0.02 0.06

GUIDE RAIL

PRELIMINARY			
C.	26.61	F.	0.00
FINAL			
C.		F.	
T.C.		T.F.	

238+50.00

40 30 20 10 0 10 20 30 40 30 20 10 0 10 20 30 40

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION

CROSS SECTIONS

SCALE: 1 INCH = 5 FEET

Dist.	County	Route	Sect.	Prelim. Bk. No.	Final Bk. No.	Sheet No.
1-0	ERIE	3001	B01			4 OF 4

PLOTTED: 18-MAY-2010 09:23

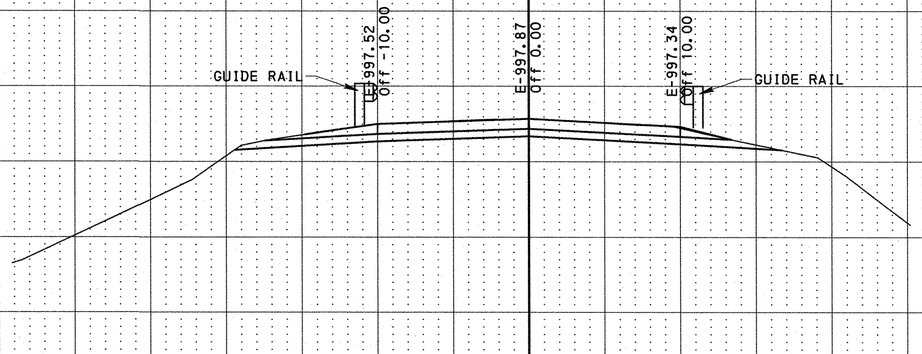
OPERATOR:
FILE NAME: G:\ds10\E3001B01\Inroads\E3001B012d.dgn

80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80

LIMIT OF WORK
STA. 241+40.00

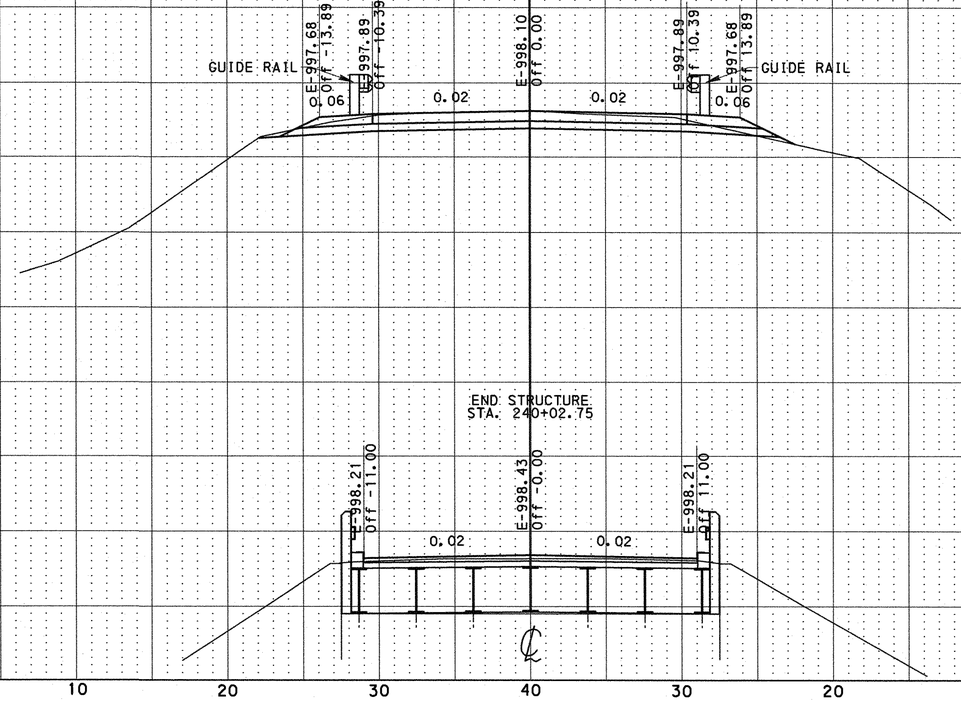
STOP WORK
STA. 240+40.00

END GUIDE RAIL CONNECT TO EXISTING LT. & RT.
END FULL DEPTH RECONSTRUCTION
MATCH EXISTING PAVEMENT
STA. 240+40.00



PRELIMINARY			
C.	33.97	F.	0.00
FINAL			
C.		F.	
T.C.		T.F.	

240+40.00



PRELIMINARY			
C.	28.55	F.	0.00
FINAL			
C.		F.	
T.C.		T.F.	

240+25.00

END STRUCTURE
STA. 240+02.75

PRELIMINARY			
C.	0.00	F.	0.00
FINAL			
C.		F.	
T.C.		T.F.	

240+02.75

40 30 20 10 0 10 20 30 40 30 20 10 0 10 20 30 40

Finals Plotted By	
Finals Checked By	
Area By	
Area Checked By	
Original Checked By	
Template By	
Area By	
Application No.	
Route No.	
Original Plotted By	

CONTRACTOR	:	W.L. Dunn Cochranton, Pennsylvania.
WORK STARTED	:	October, 27, 1947.
WORK COMPLETED	:	August, 17, 1948.
FINAL INSPECTION	:	August, 16, 1948 by G.D. Myers and G.R. Emery
ASSISTANT ENGINEER	:	G.F. Furst.
INSPECTORS	:	J.C. Shaffer and M.B. Stetson.

~ MATERIALS ~

CONCRETE : Class B Concrete
Type "C" Portland Cement. Standard Ptld. Cement Co, Painesville, Ohio.
Pa. Nos. 2B and 3A Stone. Inland Lime and Stone Co, Manistique Michigan.
Sand. Kelley Island Lime and Transport Co, Erie, Pennsylvania.
STRUCTURAL STEEL Bethlehem Steel Co., Bethlehem, Pennsylvania.
BRIDGE FLOORING STEEL Reliance Steel Products Co, McKeesport, Pennsylvania.
PAINT : Eagle Paint and Varnish Co, Pittsburgh, Pennsylvania.

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF HIGHWAYS

FINAL DRAWINGS
OF ~~FOR~~
CONSTRUCTION
AND CONDEMNATION OF RIGHT OF WAY

ROUTE NO. 25001 SECTION NO. 1B

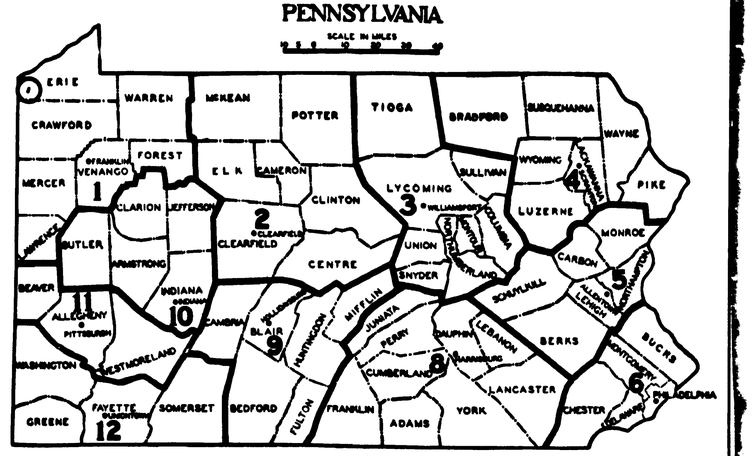
IN ERIE COUNTY

From Sta. 235+00 ✓ To Sta. 245+00 ✓

Length 1000.00 Ft. 0.19 Mi.

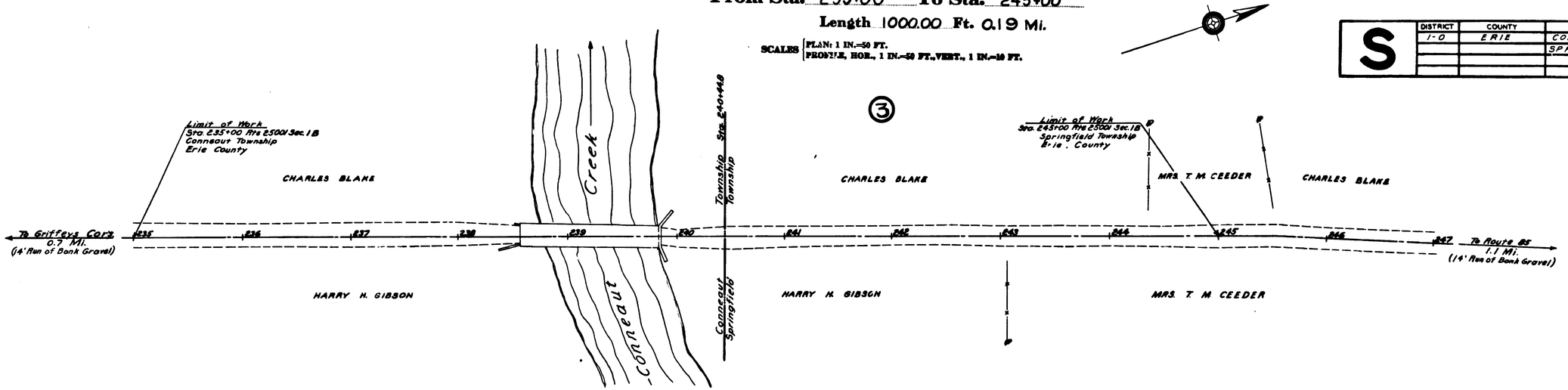
SCALES | PLAN: 1 IN.=50 FT.
PROFILE, HOR., 1 IN.=50 FT., VERT., 1 IN.=10 FT.

PENNSYLVANIA
SCALE IN MILES 0 5 10 20 30 40



4 - DISTRICT
● - DISTRICT OFFICES

S	DISTRICT	COUNTY	TOWNSHIP	BOROUGH	ROUTE	SECT.	APPL.	TOTAL SHEETS
	1-0	ERIE	CONNEAUT		25001	1B		3
			SPRINGFIELD					



INDEX MAP
Scale 1" = 50'

CONVENTIONAL SIGNS

County Line		Bridge	
City or Borough Line		Present Culvert	
Township Line		Proposed "	
Property, Right of Way Line		Telegraph Pole	
Reservation		Electric Railway Pole	
Power Line		Fence	—x—x—
Proposed Road		Hedge	
Traveled "		Stone Wall	
Rail Road		Tree	
Electric Railway		Side Stake	

Profile

RECORD OF STATIONS OF EXISTING ROAD TYPES

Adjacent to Sta. 235+00	14' Run of Bank Gravel
Sta. 235+00 to Sta. 245+00	14' Run of Bank Gravel
Adjacent to Sta. 245+00	14' Run of Bank Gravel

ESTABLISHED BY AUTHORITY OF LAW, AS AND FOR THE WIDTH, LINES, LOCATION AND GRADES OF STATE HIGHWAY ROUTE NUMBER 25001 SECT 1B FROM STA 235 +00 TO STA. 240+44.8 IN CONNEAUT TWP. AND FROM STA 240+44.8 TO STA. 245+00 IN SPRINGFIELD TWP, ERIE COUNTY.

RECOMMENDED June 20 1947
E.J. Jackson
DISTRICT ENGINEER

RECOMMENDED July 9, 1947
CHIEF ENGINEER

APPROVED July 9, 1947
Roy E. Smith
SECRETARY OF HIGHWAYS

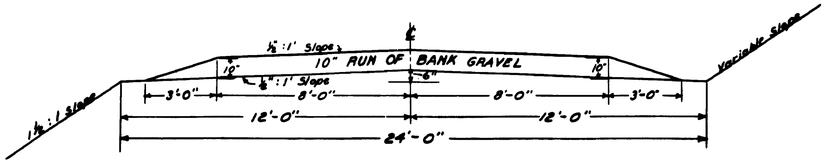
APPROVED Aug. 1 1947
Thos. H. Lawrence
GOVERNOR

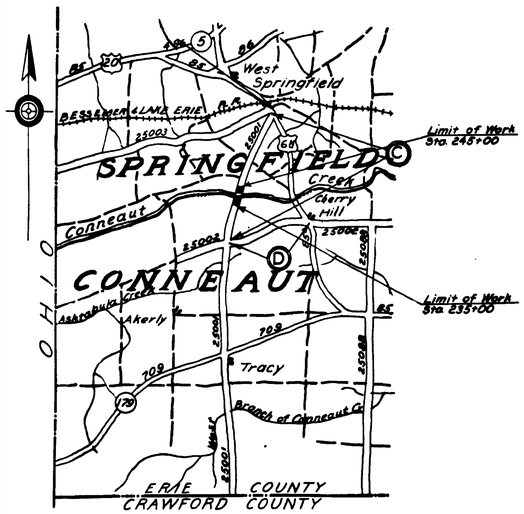
FORM 4288

DISTRICT	COUNTY	ROUTE	SEC.	SHEET
1-0	ERIE	25001	1B	2 OF 3

CONNEAUT & SPRINGFIELD TOWNSHIPS

TYPICAL SECTION





LOCATION MAP

LEGEND

State Highway Construction
Township Roads

The gross weight of trucks delivering materials to this project shall be restricted in accordance with Section 1.7.11 of the Specifications over routes designated by C and D.

GENERAL NOTES

The Existing Right of Way on Route 25001 Sec 1B from Sta. 235+00 to Sta. 245+00 is 50 feet in width. Obtained from Deeds in the Erie County Court House.

The cut slopes and shoulder widths shall be varied as directed to avoid damage to valuable trees and excessive property damage.

Construction details other than shown on these drawings shall conform to the attached Standard Sheets:

E-3	March 24, 1947
SD-1	" 29, 1947
G&F-C	February 21, 1947
GF-SP	" 21, 1947
GF-RCP	" 21, 1947

~~Either~~ Crushed Stone ~~or Washed and Crushed Gravel shall be~~ used as a Coarse Aggregate in the Steel Beam Bridge Flooring.

This project shall be constructed under the Specifications Form 408 dated July 1946.

GRADING SECTION

The following information on the estimated amounts of grading quantities has been used by the Department of Highways in its preliminary estimate for this project and shall not be taken or used as a waiver of any provisions of the Specifications and Contract. Quantities shown here are approximate.

Stations	Length in Feet	Cu. Yds. of Class 1 Excavation	Cu. Yds. of Class 2 Excavation	Cu. Yds. of Completed Embankment	Cu. Yds. of Borrow Excavation
235+00 - 245+00	1000.0'	~~4185~~	~~912~~	~~1738~~	
	FINAL	2031	844.8	1998	

PUBLIC UTILITIES

Springfield Telephone Co.... W. Springfield, Pa.
Northwestern Electric Co.. Cambridge Springs, Pa.

OVERALL LENGTH OF PROJECT 1,000.00 LIN. FT.

TRACED BY
FINAL BY

FORM 4228

DISTRICT	COUNTY	ROUTE	SEC	SHEET
1-0	ERIE	25001	1B	3 OF 3

CONNEAUT & SPRINGFIELD TOWNSHIPS

FINAL QUANTITIES	REQUIRED LIST
61.4	Sta 235+00 to Sta 238+25 Parallel Ditch Lt - 3' Bottom 128 C.Y. Exc. Class 2
123.5	Sta. 235+00 to Sta 238+25 Parallel Ditch Rt. - 2' Bottom 5C.Y. Exc. Class 2
500	Sta. 235+00 to Sta. 245+00 498 C.Y. Run of Bank Gravel (Surface)
Included above	Sta. 237+00 to Sta. 238+25 Parallel Ditch Rt - 2' Bottom 83 C.Y. Exc. Class 2
38	Sta. 238+28 38 Lin. Ft. 24" Corr. Metal Pipe
1	1 Type "A" Endwall Rt.
1	1 Special "A" Endwall Lt.
34.4	29 C.Y. Exc. Class 2 (Pipe & Endwall)
20	Sta. 238+ 20 Lin. Ft. 36" Corr. Metal Pipe Lt. to outlet through Wing of Bridge.
2.9	22 C.Y. Exc. Class 2 (Pipe)
5.6	Sta. 243+90 - 245+07 Parallel Ditch RT. C.Y. Class 2 Excavation
41	Sta 243+ Drive Lt. C.Y. Embankment.
256 1	Sta. 240+05 to Sta 242+61 256 Lin. Ft. Type 1-C Guard Fence Lt. 1 Type "C" End Anchorage
256 1	Sta. 240+05 to Sta 242+61 256 Lin. Ft. Type 1-C Guard Fence Rt. 1 Type "C" End Anchorage
0 18 6	Sta. 244+ 3 C.Y. Exc. Class 1 (Grade Drive Rt.) 16 Lin. Ft-15" Corr. Metal Pipe 3 C.Y. Exc. Class 2 (Pipe)
	Sta. 240+17 Proposed Wing Wall Rt. to be tied into existing Retaining Wall as directed
1813 611 413.7 40 200176 3444	Sta. 239+32.10 Steel Beam Floor I-Beam Bridge. Span: 2@70', Skew 90° Clear Rdwy 22' Clear. Nom. Near Abt. 15', Pier 17', Far Abt. 15' Act. 15.30' 4102 C.Y. Cl. 1 Exc. (Channel) 49 C.Y. Cl. 1 Exc. (In back of wing) 652 C.Y. Cl. 2 Exc. 412 C.Y. Class B Conc. 40 Lbs. Reinforcement Bars. 200500 Lbs. Plain Structural Steel. 3442 Sq. Ft. Steel Beam Bridge Flooring, 4½" in Depth. "D" bars 4 - 5'-0" x 5/8" ϕ "E" bars 4 - 4'-6" x 5/8" ϕ S-1048 Appr. 10-25-39 S-1045-B " 12-1-37 S-181 " 12-15-39 S-700 " 12-15-39
✓	Removal of Exist'g Bridge Superstructure, Sta. 239 + No Salvage.
#1000.00	Lump Sum. Item 40.

B.M. Corner House Pdn.
49.6' Left Sta. 233+51
Elev. 1032.3'

B.M.-W.I. Spike in W. Side 60" Willow
± 100' Right of Sta. 241+00
Elev. 1000.00

New B.M. Bent Spike in Root of 36" Maple
21' Right Sta. 247+15
Elev. 1022.04

P.O.T. Sta. 240+44.8
Book 2346 Page 7

P.O.T. Sta. 244+00
Book 2346 Page 11

P.I. Sta. 245+50.4
Δ 102° 39'
Δ 2° 39' Rt
No Curve
Book 2346 Page 11

Area taken or Channel Change necessary to protect Highway

Covered Timber Truss Bridge
Single Span 113'
Overhead Clear. 11.5'
Underclear 14'
Rowy Clear 18'
90° Skew
Stone & Conc. Abut's

Flood Channel
High Water Channel
Low Water Channel
Creek

Proposed Channel
Township Sta 240+36
Township Sta 240+46

CHARLES BLAKE
MRS. T. M. CEEDER
HARRY H. GIBSON

Required Right of Way
Required Limit of Slope
Test Hole #1
Test Hole #2
Test Hole #3
Test Hole #4
Test Hole #5
Test Hole #6

To Griffeys Cors
0.7 Mi
(1¢ Run of Bank Gravel)

To Route 85
1.1 Mi
(1¢ Run of Bank Gravel)

N 18°30' E
N 21°09' E

Old Well (Covered)
Stone Base
Bush
Corn Drive

Conneaut Springfield
High Water Channel
Low Water Channel
Flood Channel

LOG OF TEST HOLE BORINGS

Test Hole #1 — 15' Left — Sta. 238+60.6 — Ground Elev. 1008.18
3 ft/ft Loam El. 1005.18
8 ft/ft Clay El. 1003.12
11 ft/ft Gravel El. 1001.62
18 ft/ft Limestone El. 998.12
105 ft/ft Limestone
Refusal Elev. 1000.56

Test Hole #2 — 15' Rt. — Sta. 238+60.6
Ground Elev. 998.62
Refusal Elev. 993.00

Test Hole #3 — 15' Lt. — Sta. 239+42.1
Ground Elev. 998.22
Refusal Elev. 992.60

Test Hole #4 — 15' Rt. — Sta. 239+42.1
Ground Elev. 998.72
Refusal Elev. 992.60

Test Hole #5 — 15' Rt. — Sta. 240+13.6
Ground Elev. 998.72
Refusal Elev. 992.60

Test Hole #6 — 15' Rt. — Sta. 240+13.6
Ground Elev. 1006.95
Avg. 6 ft/ft per Ft. Clay El. 1002.45
Avg. 15.88 ft/ft Loam El. 994.45
Avg. 6 ft/ft per Ft. Sand El. 991.45
150 ft/ft Limestone El. 985.45
105 ft/ft Limestone
Refusal Elev. 983.25

Diameter of Rod ¾"
Weight of Hammer 50 lb.
Length of Stroke 24"
Waterway Area Required 2672 Sq. Ft.
Waterway Area Provided 2202 Sq. Ft.
Max. Fdn. Pressure

Ground Elev. 1003.96
Top Soil Avg. 21 ft/ft
Loam Avg. 15.88 ft/ft
El. 994.45
El. 991.45
Limestone
El. 984.35
Limestone
Refusal Elev. 983.25

Limit of Work
Sta. 235+00 Rte 25001 Sec 1B
Conneaut Township
Erie County

Limit of Work
Sta. 243+90 Rte 25001 Sec 1B
Springfield Township
Erie County

Slope 1½:1
Existing Ground
Slope 1½:1
10'
143'
TYPICAL CHANNEL SECTION

Drainage area 150 Sq. mi.
Waterway area required 2971 Sq. Ft.
Waterway area provided 2142 Sq. Ft.
Maximum foundation pressure 4.0 Tons per sq. Ft.

Sta. 235+00 to Sta. 245+00
Excav 2182 C.Y.
Embank 1872 C.Y.

Scale 1" = 6'
DATUM 980
DATUM 950.00

P.I. Sta 238+00
Elev. 1011.80
L-100' M-0.17'

P.I. Sta 243+80
Elev. 1003.90
L-300' M-1.89

High Water Elev. 1003.0

Prof. Top Water Lt.
Prof. Str. Bed Lt.
Prof. Top Water Rt.
Prof. Str. Bed Rt.

Dr. Lt.
Dr. Rt.

Final Book 3512
Book 2346
Page 27-45

TRACED BY
FINAL BY

US Army Corps of Engineers®
Buffalo District

CONNEAUT CREEK SEA LAMPREY BARRIER PROJECT
P2# 495058

Section 506 – Water Resources Development Act of 1992, as amended Great Lakes Fishery and Ecosystem Restoration

Erie County, Pennsylvania

Appendix A-4:
Cost Engineering

1 Project Location & Background

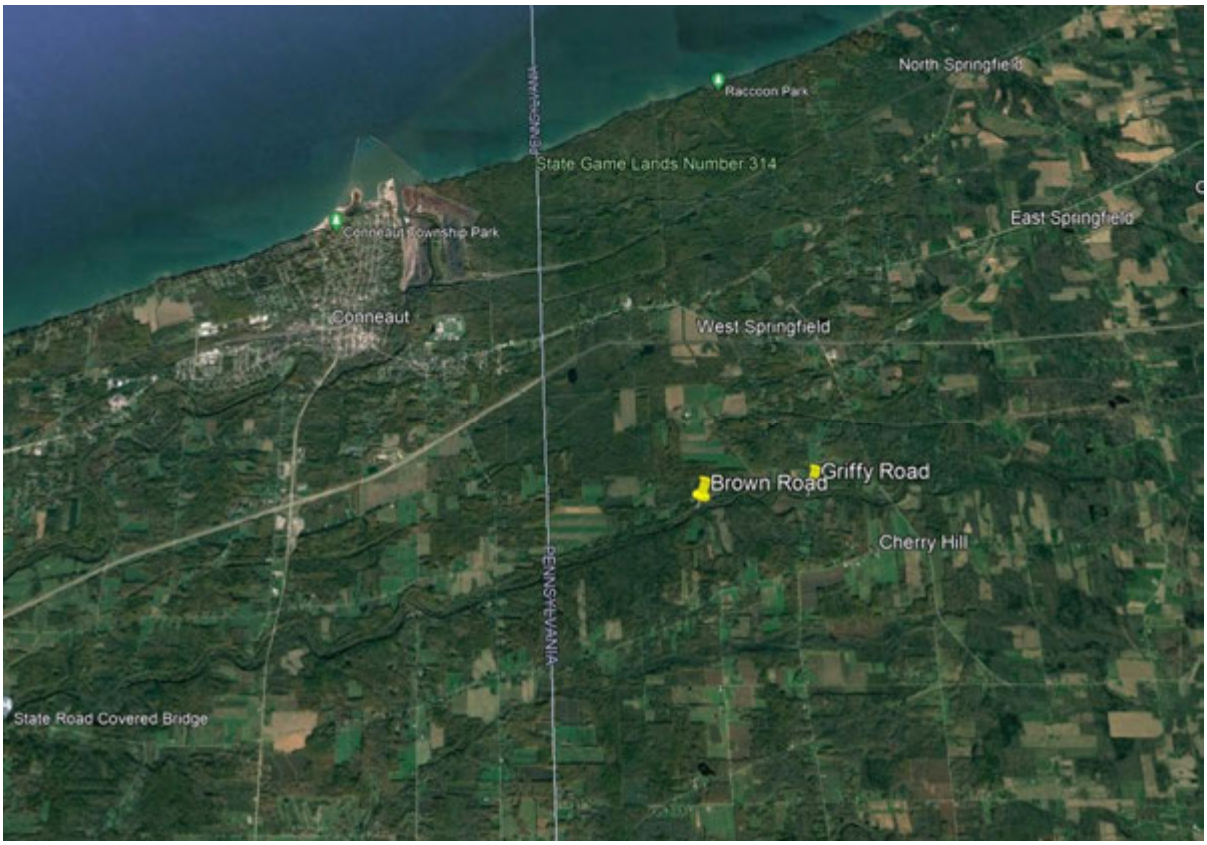


Figure 1: Project Location (Reference Google Earth)

The West Branch of the Conneaut Creek provides suitable habitat for spawning for many aquatic species, the attraction is not only to beneficial species but invasives as well. Sea Lamprey are an invasive species to the Great Lakes that utilize streams for spawning habitat. They are a parasitic fish that will destroy native and sport fish species. There are only a few measures that has the potential to curb the population of Sea Lamprey, applying lampricide and creating a barrier to prevent upstream intrusion. Lampricide is only so effective and can have negative impacts on the local fauna. A barrier system is likely to be more effective than current applications of lampricide as well reduce the negative impacts associated with its application.

2 Array of Alternatives

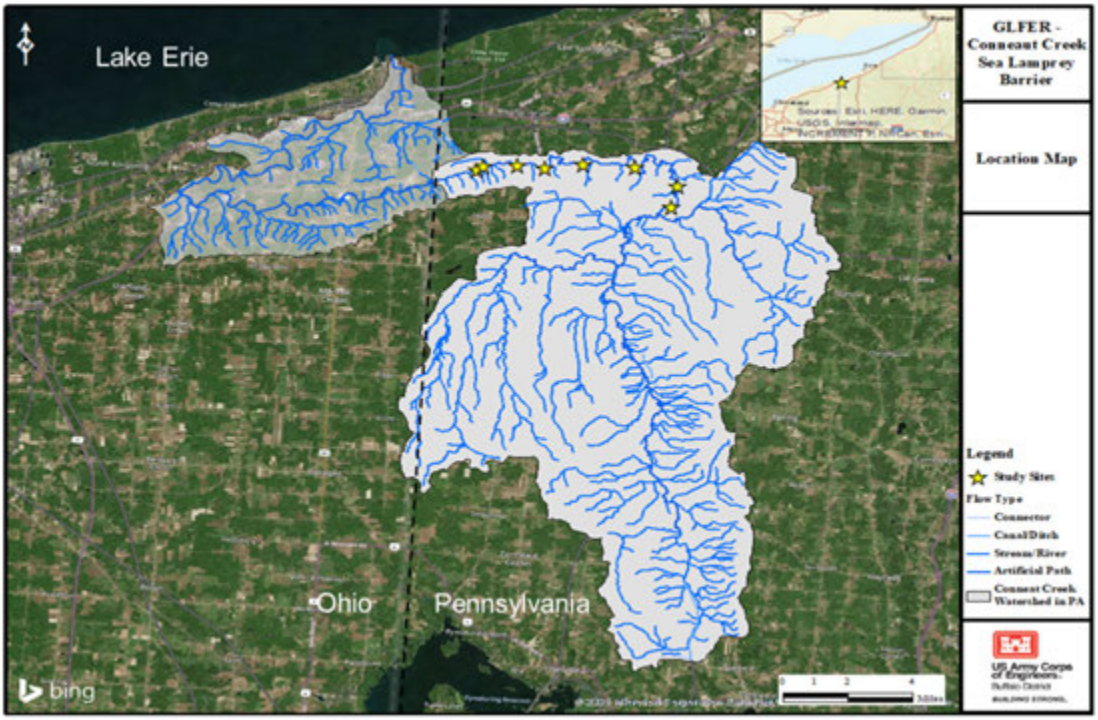


Figure 2: Array of Locations (Reference: PDT)

Several sites are had been considered during the project. The Project Delivery Team (PDT) had determined several locations suitable for a barrier and other alternatives and proceeded to investigate further if these locations would be viable for construction. Landowners were sent Right of Entries (ROE) for the PDT to investigate further but there was a lack of public interest which limited site visits. Door knocking campaigns didn't produce many more ROEs, which solidified the lack of public interest for the project. This narrowed our list down to two locations, Brown and Griffey Roads.

There are several alternatives with the same components in various assemblies. There are 3 types of barrier elevations, High, Low and Riverbed. The high fixed crest barrier will sit ~16 ft tall from the base of the stream. This is well above flow conditions and will not allow anything upstream. This will also cause a backup of water behind the barrier and some potential inundation of landowner's property.

The Low fixed crest barrier will sit ~8 ft tall from the base of the stream and will sit above normal flow conditions. This will cause some backup of water behind the barrier and some inundation for property owners. It is possible for flow conditions to exceed the height of the barrier and allow for fish to swim over. That is where the secondary

measures come in to prevent anything from swimming upstream in high flow events. Embedded in the barrier is a series of electrodes that will electrify the water and stun anything attempting to swim upstream during these high flow events.

The final alternative is a concrete pad that lies flat with the riverbed and contains an adjustable barrier that can be raised or lowered by inflating/deflating a bladder. This will raise up about ~6 ft to prevent anything swimming upstream. This alternative contains a secondary measure, an electric deterrent. This will be turned on when flows create a seamless column of water above the adjustable barrier. Additionally examined was utilizing an electric only deterrent with this flat concrete pad. These alternatives will not impact any sort of inundation and will not impact landowners in any way. The fixed crest elevated barriers will be year-round measures which will completely impact the rivers flow and the ability for any species to reach upstream. Fish ladders and jumping pools will be included in these to allow certain species around the barrier. The electric barrier for the riverbed alternative would only be active during spawning season, late May through July.

3 Recommended Plan

The Recommended Plan was selected as due to the Cost Effectiveness and Incremental Cost Analysis for each alternative. Because of the pristine nature of the upstream wetlands, any option that caused inundation would be deemed Non-Cost Effective. This removes any of the fixed crest barriers from our alternative selection, leaving 2 options, Adjustable Crest Barrier, and Electric only option. The Adjustable crest barrier with electric had the highest Annual Acreage Habitat Units and the highest Cost/Output.

Figure 3: Recommended Plan (Reference PDT)

With assistance from the Ecological Benefits calculations and input from the local sponsors adjustable barrier was chosen as the Recommended Plan. This fit within our own constraints to maintain the highest quality ecosystem upstream and with the local sponsors interests having elevated protection against Sea Lamprey.

The Recommended Plan would be constructed to ensure that Sea Lamprey would not be able to navigate upstream during mating season. The adjustable gate would be in operation during those months, generally May through August. The rest of the year, the barrier will lay flat and will not cause any obstructions or inundation upstream. There will be situations where higher-than-normal flow conditions connect the upstream and downstream seamlessly and the adjustable barrier will be proven ineffective at stopping Sea Lamprey. This is the reason an electric deterrent included as a secondary measure. This technology is utilized by the Chicago District in the Chicago Area Waterway System, separating the Mississippi River from Great Lakes preventing any species from spreading from two independent ecosystems. The Chicago District was consulted for Operations and Maintenance concerns, as well as personnel and wildlife safety.

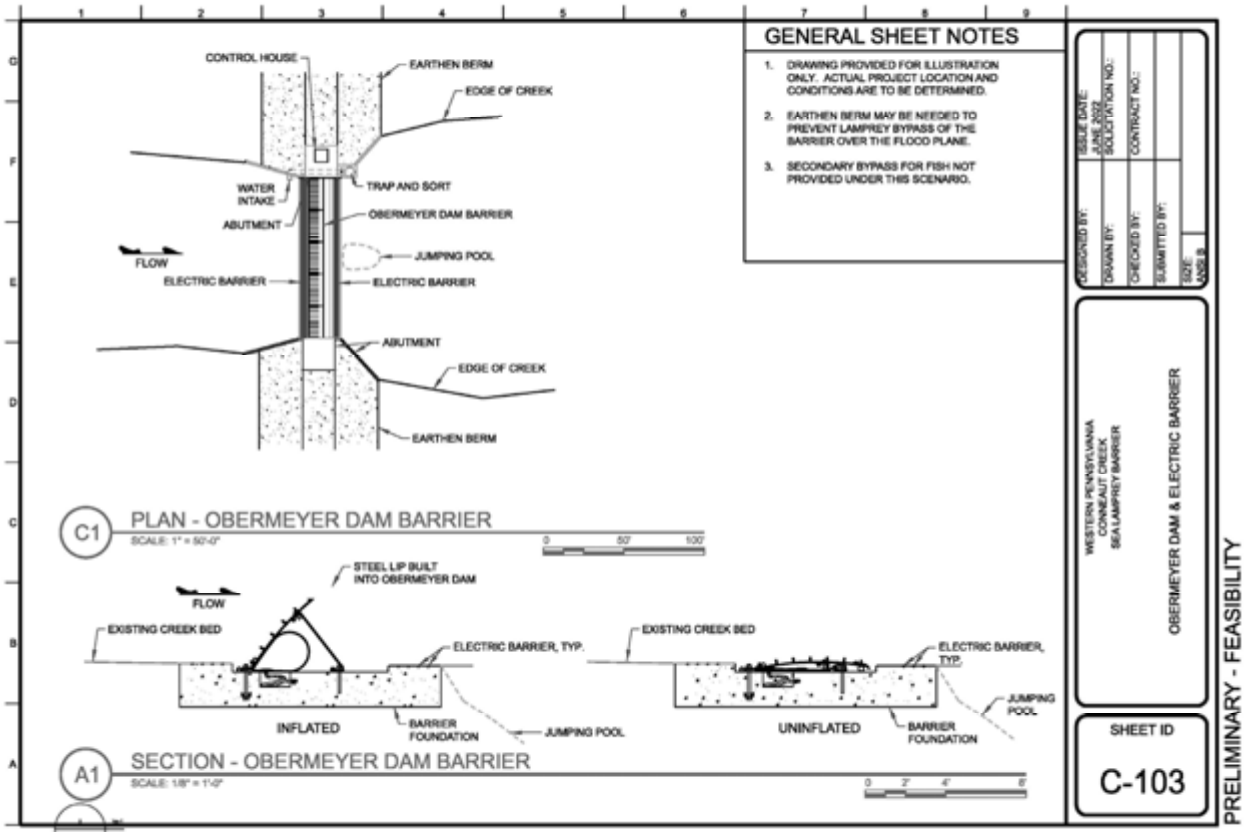


Figure 4: Plan View and Cross Section of Recommended Plan. (Reference: PDT)

The Recommended Plan consists of a concrete barrier placed below the current river bottom, laying level with the current bottom elevations. This will serve as the location where the main barrier components are attached. The Obermeyer gate, inflating bladder and electric diodes will be connected to the concrete foundation. An earthen berm will be on either side of the barrier. This will also feature a jumping pool and a trap and sort. There will be a need to house the control components alongside the barrier. A control house will be on shore to power the equipment, monitor water levels, raise/lower the Obermeyer gate, and enable/disable the electric barrier. This will be an automated system with a flow monitoring station providing input when to turn on and off the electric deterrent feature.

4 Cost Estimates

4.1 CONSTRUCTION COST ESTIMATE ASSUMPTIONS

Key assumptions for estimating the construction cost of the project are as follows:

4.1.1 Equipment utilization

- Project may be contracted out to local or regional company.

4.1.2 Project area

- The Recommended Plan estimate was developed based upon the description and plans received from the PDT.

4.1.3 Materials

- Assumed materials will be obtained both locally and from the nearby region.

The construction cost estimate for this project have been prepared using MCACES 2nd Generation MII Version 4.4.3. The preparation of the cost estimate is in accordance with guidelines and policies included in: “ER 1110-1-1300 - Cost Engineering Policy and General Requirements, (26 March 1993)”; “ER 1110-2-1302 - Civil Works Cost Engineering, (30 June 2016)”; “EI 01D010, Construction Cost Estimates (1 Sept 1997)”; “EM 1110-1-8, Construction Equipment Ownership and Operating Expense Schedule, Region I, (Nov 2018)”; and “EM 1110-2-1304, Civil Works Construction Cost Index System (CWCCIS), (Mar 2019)”; “ETL 1110-2-573, Construction Cost Estimating Guide for Civil Works, (30 Sept 2008).” The estimates were completed using the latest guidance from OCE concerning implementation of the Civil Works Breakdown Structure (CWBS) and Chart of Accounts.

4.2 COST DATABASES

COST BOOK: 2023 MII English Cost Book
LABOR: Wage Determination PA20240002 Erie County, PA 01/05/2024
EQUIPMENT: MII Equipment 2022 Region 01 Rev 2

4.3 ESTIMATE CLASSIFICATION

As per “ER 1110-2-1302 - Civil Works Cost Engineering, (15 Sept 2008)” this estimate has been

developed to a Class 3 Estimate.

"(3) Class 3 – Technical information (including designs) are approaching a 10-60% quality of project definition. There is greater confidence in project planning and scope, construction elements and quantity development. The estimates rely less on generic cost book items, greater reliance on quotes, recent historical and site-specific crew-based details. Class 3 estimates are a reflection of improved technical documents. The estimates must be supported by a technical information (scope, design, acquisition and construction methods, etc.) discussion within the estimate and the uncertainties associated with each major cost item in the estimate. Special attention must be given to large construction elements and items that are sensitive to technical information change. Typical Contingency Range could be 20% to 50%."

4.4 DIRECT COSTS

Direct costs are based on anticipated equipment, labor, and materials necessary to construct this project. Direct costs have been calculated independent of the contractor assigned to perform the tasks. Following formulation of the direct cost, a determination is made as to whether the work would be performed by the prime contractor or a subcontractor.

Quantities

The cost estimate for this project is based on material quantity take-offs developed from the current design drawings, profiles, cross sections and design and environmental quantity spreadsheets (see Attachment 1).

Crews

Project specific crews have been developed for use in estimating the direct costs for items not estimated using job quotes or historical cost information. Crew members consist of selected labor classifications and equipment pieces assembled to perform specific tasks. Productivity has been assigned to each crew reflective of the expected output per unit of measure for the specific activities listed in the cost estimate. Foremen have also been considered in the crews.

Price Quotes

The following price quotes were received:

1. Smith-Root provided a quote on 1/24/24 for their electric fish deterrent system totaling

$415,00.

2. A quote was recieved from Austin Servall for Concrete in Erie, PA on 1/23/24 for $243/CY including admixtures.
3. Porta-King Building Systems provided a quote for a Modular Control Building totaling $67,104 for a 15 ft x 15 ft building on 2/6/24.
4. IndustLabs Inc provided a quote for a control panel for the operation of the electric barrier. Programing and Hardware would be provided for a total of $29,380.

Sales Tax

Erie County, Pennsylvania sales tax of 6% has not been applied to all materials incorporated into the project.

4.5 INDIRECT COSTS

Indirect costs are those costs which cannot be attributed to a single task of construction work. These costs include the prime contractor markups such as overhead, profit, bond, and certain taxes.

Prime Contractor

Prime Contractors markups:

- JOOH – 7.93%
- HOOH – 15%
- Profit - 10%
- Bond - 2%

Subcontractors

Currently this estimate contains subcontractors for Concrete and Electricians. The electricians will be tasked with setting up the electrical components ranging from electrical diodes on the dam to furnishing the prefabricated building. The concrete subcontractor will be responsible for concrete forms, placement, and finishing.

Risk-Based Contingency Development

Contingency is money added to the estimated direct and indirect construction costs to cover unknowns, unforeseen uncertainties, and/or unanticipated conditions that are not possible to adequately evaluate of determine from the data on hand at the time the cost estimate is prepared. Contingencies relate to the uncertainties of the current know and defined project scope and are not a prediction of future project scope or schedule changes.

At this time, an Abbreviated Risk Analysis has been completed and a 32% contingency.

4.6 Operations and Maintenance Costs

O&M costs have been considered for this project because of the seasonal operation aspects. Depending on the barrier used, the electric components will either be on full time during the season (late May to early August), or during events when water flow exceeds barrier height during the season. A full depth system will run during the entirety of the season, preventing anything from going upstream. A low fixed crest barrier will run only during those high flow events. Operational costs were developed based on the system operation for the two systems, the full depth being a 30kW system and the half depth an 18kW system. Based on the kW used, Operations costs will be provided to the local sponsors to see what costs will likely be incurred during use.

4.7 Cost Engineering Products

Attached to this document is the MCACES report for the Recommended Plan, summary of the ARA and summary of the TPCS.

MCACES Report: Recommended Plan (Attachment # 2)

Abbreviated Risk Analysis: Recommended Plan (Attachment #3)

Total Project Cost Sheet (Attachment #4)

4.8 BASIS OF ESTIMATE

Construction Sequence

1. Mobilization
2. Clearing/Grubbing
3. Water Diversion Right Bank Setup
4. Right Bank Construction
5. Water Diversion Left Bank Setup
6. Left Bank Construction
7. Site Cleanup
8. Demobilization

This project will be completed in one construction season. The prime contractor will mobilize on

site and gain access to the location by clearing and grubbing. Gravel will be placed for a road and parking area, which will eventually the location of the housing for the automated electrical system. All equipment will be mobilized to this gravel road, adjacent to the river. First the right bank will start to be constructed by placing jersey barriers, plastic sheeting, and sandbags. This will occur during low river flow, which should allow for construction during this time. Half the river will be excavated and constructed first. Once complete, all equipment and materials will transfer to the other side and the other bank will be completed.

PROJECT DURATION
Year 2025 – May – Start Plans & Specs
Year 2026 – January – P&S to Contracting
Year 2026 – March – Bid Received
Year 2026 – April – NTP
Year 2026 – May – Mobilization
Year 2026 – October – Demobilization
Year 2027-2030 – Environmental Monitoring
Year 2030 – January – Project Complete

5 Attachments

Attachment 1 – Quantities for Recommended Plan

South Abutment Wall			
Length	Area	CF	CY
75	40.375	3028.125	112.1527778
		Rounded up	**115**

North Abutment Wall			
Length	Area	CF	CY
146	38.578	5632.388	208.606963

Deduction from concrete volume for sloping abutment wall				
length	height	depth	Volume Deduction	Vol Deduction- CY
14	7	1.5	73.5	2.722222222
			Total Vol	205.8847407
			Rounded Up	**210**

Fill Volume for the Berm				
Berm Vol East of Control House				
Sta	Area	length	Avg end area	CY
0+00	154	25	139.5	129.1666667
0+25	125	25	113	104.6296296
0+50	101	25	94	87.03703704
0+75	87	15	47.6395	26.46638889
0+85	8.279			
			Total	**347.2997222**
Conical Volume of berm to the West				
b	h	V (CF)	V(CY)	Rounded up
14	7	359.1887601	13.30328741	**15**
Volume At Control House				
fill Area	Length	Volume CF	Volume CY	
138	30	4140	**153.3333333**	
			Total Fill Volume (CY)	515.6330556
			Rounded up Volume	**550**

FILL VOLUME FOR SOUTH ABUTMENT			
Area	Length of excavation	Vol CF	Vol CY
58.484	70	4093.88	177.9947826
		Rounded Vol	**180**

Attachment 2 - MCACES Estimate – Recommended Plan

Estimated by Joseph Lotz

Designed by Dustin Tellinghuisen

Prepared by Joseph Lotz

Preparation Date 2/28/2024

Effective Date of Pricing 2/28/2024

Estimated Construction Time Days

Description	Quantity	UOM	ContractCost	Contingency	Escalation	ProjectCost
Project Cost			**4,991,921**	**0**	**29,093**	**5,021,014**
Griffey Road	**1.0**	**EA**	**4,991,921**	**0**	**29,093**	**5,021,014**

Description	DirectCost	SubCMU	JOOH_PRM	HOOH_PRM	Profit_PRM	Bond_PRM	ContractCost	ProjectCost
Project Indirect Summary	**3,169,921**	**374,038**	**324,847**	**580,321**	**444,913**	**97,881**	**4,991,921**	**5,021,014**
Griffey Road	**3,169,921**	**374,038**	**324,847**	**580,321**	**444,913**	**97,881**	**4,991,921**	**5,021,014**

Attachment 3 – Abbreviated Risk Analysis – Recommended Plan

Abbreviated Risk Analysis

Project (less than $40M): **Conneaut Creek Lamprey Barrier** **Alternative:** **Low Concrete with adjustable gate a**
Project Development Stage/Alternative: **Feasibility (Recommended Plan)**
Risk Category: **Moderate Risk: Typical Project Construction Type** **Meeting Date:** **5/16/2023**

Total Estimated Construction Contract Cost = **$ 5,021,014**

	CWWBS	Feature of Work	Contract Cost		% Contingency	$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	$ -		0.00%	$ -	$ -
1	32 01 MOB, DEMOB & PREPARATORY WORK	**Mob/Demob Site Prep Work**	$ 812,579		17.93%	$ 145,674	$ 958,253
2	04 DAMS	**Water Diversion**	$ 288,832		28.20%	$ 81,441	$ 370,273
3	04 DAMS	**Concrete Barrier/ Berm/ Wingwalls**	$ 1,152,474		26.46%	$ 304,904	$ 1,457,379
4	04 DAMS	**Electric Barrier and Control Features**	$ 1,450,929		39.77%	$ 576,986	$ 2,027,915
5	04 DAMS	**Obermeyer Gate**	$ 1,316,199		43.02%	$ 566,215	$ 1,882,414
6			$ -		0.00%	$ -	$ -
7					0.00%	$ -	$ -
8			$ -		0.00%	$ -	$ -
9			$ -		0.00%	$ -	$ -
10			$ -		0.00%	$ -	$ -
11			$ -		0.00%	$ -	$ -
12	All Other	**Remaining Construction Items**	$ 0	*0.0%*	5.00%	$ 0	$ 0
13	30 PLANNING, ENGINEERING, AND DESIGN	**Planning, Engineering, & Design**	$ -		0.00%	$ -	$ -
14	31 CONSTRUCTION MANAGEMENT	**Construction Management**	$ -		0.00%	$ -	$ -
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)					$ -	

Totals					
Real Estate	$ -	0.00%	$ -	$ -	
Total Construction Estimate	$ 5,021,014	33.36%	$ 1,675,220	$ 6,696,234	
Total Planning, Engineering & Design	$ -	0.00%	$ -	$ -	
Total Construction Management	$ -	0.00%	$ -	$ -	
Total Excluding Real Estate	**$ 5,021,014**	**33%**	**$ 1,675,220**	**$ 6,696,234**	
		Base	**50%**	**80%**	
Confidence Level Range Estimate ($000's)		$5,021k	$6,026k	$6,696k	

* 50% based on base is at 5% CL.

Fixed Dollar Risk Add: (Allows for additional risk to be added to the risk analsyis. Must include justification. Does not allocate to Real Estate.	

Conneaut Creek Lamprey Barrier Low Concrete with adjusta

Feasibility (Recommended Plan)
Abbreviated Risk Analysis
Meeting Date: 16-May-23

Risk Level

	Negligible	Marginal	Moderate	Significant	Critical
Very Likely	2	3	4	5	5
Likely	1	2	3	4	5
Possible	0	1	2	3	4
Unlikely	0	0	1	2	3

Risk Register

Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level
Project Management & Scope Growth				**Maximum Project Growth**		**75%**
PS-1	Mob/Demob Site Prep Work	Site Access.	Possible for local landowners to not allow access to site for construction.	Marginal	Possible	1
PS-2	Water Diversion	Future considerations for water diversion.	Currently jersey barriers, sandbags and plastic sheeting used for water diversion. Potential for growth if conditions are not as they assumed to be.	Moderate	Possible	2
PS-3	Concrete Barrier/ Berm/ Wingwalls	Local sponsors want higher wingwalls on product.	The wingwalls have been raised to cover the concerns of the sponsor, H&H indicated this will not be more/less protective for high flow events but it satisfies the sponsors specifications.	Marginal	Possible	1
PS-4	Electric Barrier and Control Features	Proprietary technology.	The usage of proprietary technology has the potential to cause higher costs in the future. Conversations with LRC have provided lessons learned and technology alternatives we can use in the future. They parted ways with smith-root over O&M costs and limitations. The project was advertised as a generic	Marginal	Possible	1
PS-5	Obermeyer Gate	Excessive O&M costs.	Non-federal sponsor is nervous about higher than usual O&M costs associated with Obermeyer Gate. A bracing system will be included in design to lower the wear and tear on the bladder system. This will also be used to prevent species from being caught behind the barrier.	Moderate	Possible	2
PS-6	0			Negligible	Unlikely	N/A
PS-7	0			Negligible	Unlikely	N/A
PS-8	0			Negligible	Unlikely	N/A

PS-9	0			Negligible	Unlikely	N/A
PS-10	0			Negligible	Unlikely	N/A
PS-11	0			Negligible	Unlikely	N/A
PS-12	Remaining Construction Items			Negligible	Unlikely	0
PS-13	Planning, Engineering, & Design			Negligible	Unlikely	0
PS-14	Construction Management			Negligible	Unlikely	0
Acquisition Strategy				**Maximum Project Growth**		**30%**
AS-1	Mob/Demob Site Prep Work	• Requirement for subcontracting • Accelerated schedule or harsh weather schedule • High-risk acquisition limits competition, design/build • Limited bid competition anticipated • Bid schedule developed to reduce quantity risks	Acquestion to be full and Open Contract.	Marginal	Possible	1
AS-2	Water Diversion	• Requirement for subcontracting • Accelerated schedule or harsh weather schedule • High-risk acquisition limits competition, design/build • Limited bid competition anticipated • Bid schedule developed to reduce quantity risks	Acquestion to be full and Open Contract.	Marginal	Possible	1
AS-3	Concrete Barrier/ Berm/ Wingwalls	• Requirement for subcontracting • Accelerated schedule or harsh weather schedule • High-risk acquisition limits competition, design/build • Limited bid competition anticipated • Bid schedule developed to reduce quantity risks	Acquestion to be full and Open Contract.	Marginal	Possible	1
AS-4	Electric Barrier and Control Features	• Requirement for subcontracting • Accelerated schedule or harsh weather schedule • High-risk acquisition limits competition, design/build • Limited bid competition anticipated • Bid schedule developed to reduce quantity risks	Acquestion to be full and Open Contract.	Marginal	Possible	1
AS-5	Obermeyer Gate	• Requirement for subcontracting • Accelerated schedule or harsh weather schedule • High-risk acquisition limits competition, design/build	Acquestion to be full and Open Contract.	Marginal	Possible	1
AS-6	0			Negligible	Unlikely	N/A
AS-7	0			Negligible	Unlikely	N/A
AS-8	0			Negligible	Unlikely	N/A
AS-9	0			Negligible	Unlikely	N/A
AS-10	0			Negligible	Unlikely	N/A

AS-11	0			Negligible	Unlikely	N/A
AS-12	Remaining Construction Items			Negligible	Unlikely	0
AS-13	Planning, Engineering, & Design			Negligible	Unlikely	0
AS-14	Construction Management			Negligible	Unlikely	0
Construction Elements				**Maximum Project Growth**		**25%**
CON-1	Mob/Demob Site Prep Work	Typical mob and demob and prep of area for construction. Area is rather narrow and may be cause for stacking of equipment or trades	Stacking of trades and or equipment may increase costs marginally.	Marginal	Possible	1
CE-2	Water Diversion	Future considerations for water diversion.	Currently jersey barriers, sandbags and plastic sheeting used for water diversion. Potential for growth if low flow conditions are not present during construction then a more substantial approach may be necessary.	Marginal	Possible	1
CE-3	Concrete Barrier/ Berm/ Wingwalls	In water construction work and potentially construction under the bridge.	Heavy machinery could damage walls, roadway, bridge due to the proximity of infrastructure to the project location. This project is in river, storm events could slow work or cause other negative consequences.	Moderate	Possible	2
CE-4	Electric Barrier and Control Features	Electric Barrier Location.	It has been suggested changing the location of the electric barrier. The barrier appears to be in a fixed location but there is potential for the electric diodes to be attached to the obermeyer system. This will add complexity to the construction process and potentially add unintended consequences utilizing both these methods together(I.E. in water electricity shorting obermeyer controls).	Moderate	Possible	2
CE-5	Obermeyer Gate	Proprietary technology.	There might be the need for Obermeyer personnel on-site during construction as an agreement for using their technology.	Marginal	Likely	2
CE-6	0			Negligible	Unlikely	N/A
CE-7	0			Negligible	Unlikely	N/A
CE-8	0			Negligible	Unlikely	N/A
CE-9	0			Negligible	Unlikely	N/A
CE-10	0			Negligible	Unlikely	N/A
CE-11	0			Negligible	Unlikely	N/A

CE-12	Remaining Construction Items			Negligible	Unlikely	0
CE-13	Planning, Engineering, & Design			Negligible	Unlikely	0
CE-14	Construction Management			Negligible	Unlikely	0
Specialty Construction or Fabrication				**Maximum Project Growth**		**65%**
SC-1	Mob/Demob Site Prep Work	Lead times for material.	Material delays could delay start date for mobilzation. Contractor will have to work closely with Smith-Root or concrete supplier.	Marginal	Possible	1
SC-2	Water Diversion	Future considerations for water diversion.	Currently jersey barriers, sandbags and plastic sheeting used for water diversion. Potential for growth if conditions are not as they assumed to be.	Moderate	Possible	2
SC-3	Concrete Barrier/ Berm/ Wingwalls	Confidence in the contractor could cause delays.	Depending on the contractors experience, the project could be constructed in 6 to 9 months. Overruns and delays will costs to rise.	Marginal	Possible	1
SC-4	Electric Barrier and Control Features	Proprietary technology.	Smith-root has had their hands in other USACE projects and after some back and forth, the project sponsors parted way. This could also happen to our project.	Moderate	Possible	2
SC-5	Obermeyer Gate	Proprietary technology.	System may require maintenance from Obermeyer, or subscription for automated technology.	Moderate	Possible	2
SC-6	0			Negligible	Unlikely	N/A
SC-7	0			Negligible	Unlikely	N/A
SC-8	0			Negligible	Unlikely	N/A
SC-9	0			Negligible	Unlikely	N/A
SC-10	0			Negligible	Unlikely	N/A
SC-11	0			Negligible	Unlikely	N/A
SC-12	Remaining Construction Items			Negligible	Unlikely	0
SC-13	Planning, Engineering, & Design			Negligible	Unlikely	0

SC-14	Construction Management			Negligible	Unlikely	0
Technical Design & Quantities				**Maximum Project Growth**		**30%**
T-1	Mob/Demob Site Prep Work	None	None	Negligible	Unlikely	0
T-2	Water Diversion	Future considerations for water diversion.	Currently jersey barriers, sandbags and plastic sheeting used for water diversion. Potential for growth if flow conditions are higher than assumed.	Marginal	Possible	1
T-3	Concrete Barrier/ Berm/ Wingwalls	Civil is confident in design quantities	Doesn't expect any changes in quantities provided.	Negligible	Unlikely	0
T-4	Electric Barrier and Control Features	Estimator assumed quantities for anchoring barrier system to concrete.	Quantities will be variable based on what actual specifications are required.	Marginal	Likely	2
T-5	Obermeyer Gate	Estimator assumed quantities for anchoring barrier system to concrete.	Quantities will be variable based on what actual specifications are required.	Marginal	Likely	2
T-6	0			Negligible	Unlikely	N/A
T-7	0			Negligible	Unlikely	N/A
T-8	0			Negligible	Unlikely	N/A
T-9	0			Negligible	Unlikely	N/A
T-10	0			Negligible	Unlikely	N/A
T-11	0			Negligible	Unlikely	N/A
T-12	Remaining Construction Items			Negligible	Unlikely	0
T-13	Planning, Engineering, & Design			Negligible	Unlikely	0
T-14	Construction Management			Negligible	Unlikely	0
Cost Estimate Assumptions				**Maximum Project Growth**		**35%**
EST-1	Mob/Demob Site Prep Work	Equipment and crews mobed on site.	The difference in equipment and crews brought on site would likely not be so different from the estimate vs the contractor. The differences are likely to be negligible.	Negligible	Possible	0
EST-2	Water Diversion	Estimate based on Civil/Structural assumptions.	Contractor could use this method of diversion or another potentially more expensive	Marginal	Possible	1
EST-3	Concrete Barrier/ Berm/ Wingwalls	Cost of soil delivered on site from OH.	Trucking may be more expensive with crossing state borders. Conneaut Ohio is closer than Erie PA.	Marginal	Possible	1

EST-4	Electric Barrier and Control Features	General Quote received from smith-root	Price range given, smith-root indicated they will need more information about river conditions and site specific designs. It is likely that moving forward they will not provide a more detailed quote without having a guarenteed contract for design.	Moderate	Likely	3
EST-5	Obermeyer Gate	General Quote received from obermeyer.	Quote provided but it is not a final price. It is likely that moving forward they will not provide a more detailed quote without having a guarenteed contract for design.	Moderate	Likely	3
EST-6	0			Negligible	Unlikely	N/A
EST-7	0			Negligible	Unlikely	N/A
EST-8	0			Negligible	Unlikely	N/A
EST-9	0			Negligible	Unlikely	N/A
EST-10	0			Negligible	Unlikely	N/A
EST-11	0			Negligible	Unlikely	N/A
EST-12	Remaining Construction Items			Negligible	Unlikely	0
EST-13	Planning, Engineering, & Design			Negligible	Unlikely	0
EST-14	Construction Management			Negligible	Unlikely	0
External Project Risks				**Maximum Project Growth**		**40%**
EX-1	Mob/Demob Site Prep Work	Potential for market volatility impacting competition, pricing	Weather, Fuel, Local Interests	Moderate	Possible	2
EX-2	Water Diversion	Potential for market volatility impacting competition, pricing, Enguaged Public	Weather, Fuel, Local Interests	Moderate	Possible	2
EX-3	Concrete Barrier/ Berm/ Wingwalls	Potential for market volatility impacting competition, pricing, Enguaged Public	Weather, Fuel, Local Interests	Moderate	Likely	3
EX-4	Electric Barrier and Control Features	Potential for market volatility impacting competition, pricing, Enguaged Public	Weather, Fuel, Local Interests	Moderate	Likely	3
EX-5	Obermeyer Gate	Potential for market volatility impacting competition, pricing, Enguaged Public	Obermeyer has proprietary technology and there may be more buy in than may be required. Such as a subscription, replacement with obermeyer specific parts.	Moderate	Likely	3
EX-6	0			Negligible	Unlikely	N/A
EX-7	0			Negligible	Unlikely	N/A

EX-8	0			Negligible	Unlikely	N/A
EX-9	0			Negligible	Unlikely	N/A
EX-10	0			Negligible	Unlikely	N/A
EX-11	0			Negligible	Unlikely	N/A
EX-12	Remaining Construction Items			Negligible	Unlikely	**0**
EX-13	Planning, Engineering, & Design			Negligible	Unlikely	**0**
EX-14	Construction Management			Negligible	Unlikely	**0**

Attachment 4 – TPCS – Recommended Plan

**** TOTAL PROJECT COST SUMMARY ****

PROJECT: **GLFER 506 Conneaut Creek Sea Lamprey Barrier**
PROJECT NO: **495058**
LOCATION: **Erie County, PA**

DISTRICT: **LRB**
PREPARED: **3/7/2024**
POC: **CHIEF, COST ENGINEERING, James Scungio, CCC**

This Estimate reflects the scope and schedule in report; DPR_Civil_Appendix

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)						TOTAL PROJECT COST (FULLY FUNDED)			
						Program Year (Budget EC):				2024					
						Effective Price Level Date:				1-Oct- 23					
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	REMAINING COST ($K)	Spent Thru: 1-Oct-15 ($K)	TOTAL FIRST COST ($K)	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
04	DAMS	$5,006	$1,652	33%	$6,658		$5,006	$1,652	$6,658		$6,658	7.4%	$5,379	$1,775	$7,154
14	RECREATION FACILITIES	$15	$5	33%	$20		$15	$5	$20		$20	7.4%	$16	$5	$22
			-			-						-			
			-			-						-			
	CONSTRUCTION ESTIMATE TOTALS:	$5,021	$1,657		$6,678		$5,021	$1,657	$6,678		$6,678	7.4%	$5,395	$1,780	$7,175
01	LANDS AND DAMAGES	$201	$40	20%	$241		$201	$40	$241		$241	3.9%	$209	$42	$251
30	PLANNING, ENGINEERING & DESIGN	$1,290	$155	12%	$1,445		$1,290	$155	$1,445		$1,445	9.5%	$1,413	$170	$1,582
31	CONSTRUCTION MANAGEMENT	$577	$69	12%	$646		$577	$69	$646		$646	9.3%	$630	$76	$706
	PROJECT COST TOTALS:	$7,089	$1,921	27%	$9,010		$7,089	$1,921	$9,010		**$9,010**	7.8%	$7,647	$2,067	$9,714

_____ CHIEF, COST ENGINEERING, James Scungio, CCC

_____ PROJECT MANAGER, Lex Barker, PMP

_____ CHIEF, REAL ESTATE, Robert Christie

_____ CHIEF, PLANNING, David Schulenberg

_____ CHIEF, ENGINEERING, Dustin Tellinghuisen, P.E.

_____ CHIEF, OPERATIONS, Adam Hamm, PE

_____ CHIEF, CONSTRUCTION, Matthew Snyder, PE, PMP

_____ CHIEF, CONTRACTING, Tyrone Palaganas

_____ CHIEF, PM-PB, xxxx

_____ CHIEF, DPM, David Romano, PMP

ESTIMATED TOTAL PROJECT COST:		**$9,714**
ESTIMATED FEDERAL COST:	**65%**	$6,311
ESTIMATED NON-FEDERAL COST:	**35%**	$3,403
22 - FEASIBILITY STUDY (CAP studies):		**$900**
ESTIMATED FEDERAL COST:	65%	$620
ESTIMATED NON-FEDERAL COST:	35%	$280
ESTIMATED FEDERAL COST OF PROJECT		**$6,931**

**** CONTRACT COST SUMMARY ****

PROJECT: GLFER 506 Conneaut Creek Sea Lamprey Barrier
LOCATION: Erie County, PA
This Estimate reflects the scope and schedule in report; DPR_Civil_Appendix

DISTRICT: LRB
POC: CHIEF, COST ENGINEERING, James Scungio, CCC

PREPARED: 3/7/2024

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 18-Oct-23 Estimate Price Level: 1-Oct-23				Program Year (Budget EC): 2024 Effective Price Level Date: 1 -Oct-23								
				RISK BASED										
WBS NUMBER *A*	Civil Works Feature & Sub-Feature Description *B*	COST ($K) *C*	CNTG ($K) *D*	CNTG (%) *E*	TOTAL ($K) *F*	ESC (%) *G*	COST ($K) *H*	CNTG ($K) *I*	TOTAL ($K) *J*	Mid-Point Date *P*	ESC (%) *L*	COST ($K) *M*	CNTG ($K) *N*	FULL ($K) *O*
	PHASE 1 or CONTRACT 1													
04	DAMS	$5,006	$1,652	33.0%	$6,658		$5,006	$1,652	$6,658	2026Q4	7.4%	$5,379	$1,775	$7,154
14	RECREATION FACILITIES	$15	$5	33.0%	$20		$15	$5	$20	2026Q4	7.4%	$16	$5	$22
	CONSTRUCTION ESTIMATE TOTALS:	$5,021	$1,657	33.0%	$6,678		$5,021	$1,657	$6,678			$5,395	$1,780	$7,175
01	LANDS AND DAMAGES	$201	$40	20.0%	$241		$201	$40	$241	2025Q3	3.9%	$209	$42	$251
30	PLANNING, ENGINEERING & DESIGN													
2.5%	Project Management	$125	$15	12.0%	$140		$125	$15	$140	2025Q4	6.0%	$132	$16	$148
2.0%	Planning & Environmental Compliance	$100	$12	12.0%	$112		$100	$12	$112	2025Q4	6.0%	$106	$13	$119
4.5%	Engineering & Design	$225	$27	12.0%	$252		$225	$27	$252	2025Q4	6.0%	$238	$29	$267
2.0%	Reviews, ATRs, IEPRs, VE	$100	$12	12.0%	$112		$100	$12	$112	2025Q4	6.0%	$106	$13	$119
1.2%	Life Cycle Updates (cost, schedule, risks)	$60	$7	12.0%	$67		$60	$7	$67	2025Q4	6.0%	$64	$8	$71
0.8%	Contracting & Reprographics	$40	$5	12.0%	$45		$40	$5	$45	2026Q4	9.3%	$44	$5	$49
5.0%	Engineering During Construction	$250	$30	12.0%	$280		$250	$30	$280	2026Q4	9.3%	$273	$33	$306
1.8%	Planning During Construction	$90	$11	12.0%	$101		$90	$11	$101	2025Q4	6.0%	$95	$11	$107
6.0%	Adaptive Management & Monitoring	$300	$36	12.0%	$336		$300	$36	$336	2029Q2	17.9%	$354	$42	$396
1.0%	Project Operations			12.0%										
31	CONSTRUCTION MANAGEMENT													
9.5%	Construction Management	$477	$57	12.0%	$534		$477	$57	$534	2026Q4	9.3%	$521	$63	$584
1.0%	Project Operation:	$50	$6	12.0%	$56		$50	$6	$56	2026Q4	9.3%	$55	$7	$61
1.0%	Project Management	$50	$6	12.0%	$56		$50	$6	$56	2026Q4	9.3%	$55	$7	$61
	CONTRACT COST TOTALS:	$7,089	$1,921		$9,010		$7,089	$1,921	**$9,010**			$7,647	$2,067	**$9,714**

Attachment 5 – Project Schedule

PROJECT SCHEDULE

Milestone	Scheduled
MSC Approved FID	26 May 2021 (A)
FSM	09 August 2021 (A)
FCSA Execution	21 October 2021 (A)
Begin Feasibility Phase, Receipt of Fed & Non-Fed funds	31 October 2021 (A)
Investigations	09 November 2021 (A) through 20 December 2022 (A)
Draft Existing Conditions	09 November 2021 (A) through 22 July 2022 (A)
Existing Conditions Complete & Draft Alternative Formulation	14 January 2022 (A) through 31 August 2022 (A)
Plan Selection (TSP draft DPREA)	01 September 2022 (A) through 24 August 2023 (A)
Plan Selection (DQC, ATR, LRD/LRB P&LCR, and NEPA Public Review)	25 August 2023 (A) through 06 June 2024
Final Report Phase	07 June 2024 through 04 November 2024
PPA Execution	28 June 2024 through 26 November 2024
Receive fed/non-fed $ and DDR completion	27 November 2024 through 21 May 2025
Plans and Specifications	22 May 2025 through 30 September 2025
Real Estate Certification / Ready to Award	27 November 2024 through 30 November 2025
Construction Contract Award	01 March 2026
Construction Complete	31 October 2026
Project Closeout	14 February 2027

Attachment 6 – Cost Certification

WALLA WALLA COST ENGINEERING MANDATORY CENTER OF EXPERTISE

COST AGENCY TECHNICAL REVIEW CERTIFICATION STATEMENT

For Project No. 495058

LRB – Conneaut Creek Great Lakes Fishery and Ecosystem Restoration (GLFER) – Sea Lamprey Barrier Section 506

The Conneaut Creek Section 506 as presented by Buffalo District, has undergone a successful Cost Agency Technical Review (Cost ATR), performed by the Walla Walla District Cost Engineering Mandatory Center of Expertise (Cost MCX) team. The Cost ATR included study of the project scope, report, cost estimates, schedules, escalation, and risk-based contingencies. This certification signifies the products meet the quality standards as prescribed in ER 1110-2-1150 Engineering and Design for Civil Works Projects and ER 1110-2-1302 Civil Works Cost Engineering.

As of March 11, 2024, the Cost MCX certifies the estimated total project cost:

FY24 Project First Cost:	$9,010,000
Fully Funded Total Project Cost:	$9,714,000
Federal Cost of Project:	$6,931,000

It remains the responsibility of the District to correctly reflect these cost values within the Final Report and to implement effective project management controls and implementation procedures including risk management through the period of Federal participation.

Michael P. Jacobs, PE, CCE
Chief, Cost Engineering MCX
Walla Walla District

**** TOTAL PROJECT COST SUMMARY ****

PROJECT: **GLFER 506 Conneaut Creek Sea Lamprey Barrier**
PROJECT NO: **495058**
LOCATION: **Erie County, PA**

DISTRICT: **LRB**
PREPARED: **3/7/2024**
POC: **CHIEF, COST ENGINEERING, James Scungio, CCC**

This Estimate reflects the scope and schedule in report; DPR_Civil_Appendix

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)						TOTAL PROJECT COST (FULLY FUNDED)			
						Program Year (Budget EC):				2024					
						Effective Price Level Date:				1-Oct- 23					
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	REMAINING COST ($K)	Spent Thru: 1-Oct-15 ($K)	TOTAL FIRST COST ($K)	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
04	DAMS	$5,006	$1,652	33%	$6,658		$5,006	$1,652	$6,658		$6,658	7.4%	$5,379	$1,775	$7,154
14	RECREATION FACILITIES	$15	$5	33%	$20		$15	$5	$20		$20	7.4%	$16	$5	$22
			-			-						-			
			-			-						-			
	CONSTRUCTION ESTIMATE TOTALS:	$5,021	$1,657		$6,678		$5,021	$1,657	$6,678		$6,678	7.4%	$5,395	$1,780	$7,175
01	LANDS AND DAMAGES	$201	$40	20%	$241		$201	$40	$241		$241	3.9%	$209	$42	$251
30	PLANNING, ENGINEERING & DESIGN	$1,290	$155	12%	$1,445		$1,290	$155	$1,445		$1,445	9.5%	$1,413	$170	$1,582
31	CONSTRUCTION MANAGEMENT	$577	$69	12%	$646		$577	$69	$646		$646	9.3%	$630	$76	$706
	PROJECT COST TOTALS:	$7,089	$1,921	27%	$9,010		$7,089	$1,921	$9,010		**$9,010**	7.8%	$7,647	$2,067	$9,714

_____ CHIEF, COST ENGINEERING, James Scungio, CCC

_____ PROJECT MANAGER, Lex Barker, PMP

_____ CHIEF, REAL ESTATE, Robert Christie

_____ CHIEF, PLANNING, David Schulenberg

_____ CHIEF, ENGINEERING, Dustin Tellinghuisen, P.E.

_____ CHIEF, OPERATIONS, Adam Hamm, PE

_____ CHIEF, CONSTRUCTION, Matthew Snyder, PE, PMP

_____ CHIEF, CONTRACTING, Tyrone Palaganas

_____ CHIEF, PM-PB, xxxx

_____ CHIEF, DPM, David Romano, PMP

ESTIMATED TOTAL PROJECT COST:		**$9,714**
ESTIMATED FEDERAL COST:	**65%**	$6,311
ESTIMATED NON-FEDERAL COST:	**35%**	$3,403
22 - FEASIBILITY STUDY (CAP studies):		**$900**
ESTIMATED FEDERAL COST:	65%	$620
ESTIMATED NON-FEDERAL COST:	35%	$280
ESTIMATED FEDERAL COST OF PROJECT		**$6,931**

**** CONTRACT COST SUMMARY ****

PROJECT: GLFER 506 Conneaut Creek Sea Lamprey Barrier
LOCATION: Erie County, PA
This Estimate reflects the scope and schedule in report; DPR_Civil_Appendix

DISTRICT: LRB
POC: CHIEF, COST ENGINEERING, James Scungio, CCC

PREPARED: 3/7/2024

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 18-Oct-23 Estimate Price Level: 1-Oct-23				Program Year (Budget EC): 2024 Effective Price Level Date: 1 -Oct-23								
				RISK BASED										
WBS NUMBER *A*	Civil Works Feature & Sub-Feature Description *B*	COST ($K) *C*	CNTG ($K) *D*	CNTG (%) *E*	TOTAL ($K) *F*	ESC (%) *G*	COST ($K) *H*	CNTG ($K) *I*	TOTAL ($K) *J*	Mid-Point Date *P*	ESC (%) *L*	COST ($K) *M*	CNTG ($K) *N*	FULL ($K) *O*
	PHASE 1 or CONTRACT 1													
04	DAMS	$5,006	$1,652	33.0%	$6,658		$5,006	$1,652	$6,658	2026Q4	7.4%	$5,379	$1,775	$7,154
14	RECREATION FACILITIES	$15	$5	33.0%	$20		$15	$5	$20	2026Q4	7.4%	$16	$5	$22
	CONSTRUCTION ESTIMATE TOTALS:	$5,021	$1,657	33.0%	$6,678		$5,021	$1,657	$6,678			$5,395	$1,780	$7,175
01	LANDS AND DAMAGES	$201	$40	20.0%	$241		$201	$40	$241	2025Q3	3.9%	$209	$42	$251
30	PLANNING, ENGINEERING & DESIGN													
2.5%	Project Management	$125	$15	12.0%	$140		$125	$15	$140	2025Q4	6.0%	$132	$16	$148
2.0%	Planning & Environmental Compliance	$100	$12	12.0%	$112		$100	$12	$112	2025Q4	6.0%	$106	$13	$119
4.5%	Engineering & Design	$225	$27	12.0%	$252		$225	$27	$252	2025Q4	6.0%	$238	$29	$267
2.0%	Reviews, ATRs, IEPRs, VE	$100	$12	12.0%	$112		$100	$12	$112	2025Q4	6.0%	$106	$13	$119
1.2%	Life Cycle Updates (cost, schedule, risks)	$60	$7	12.0%	$67		$60	$7	$67	2025Q4	6.0%	$64	$8	$71
0.8%	Contracting & Reprographics	$40	$5	12.0%	$45		$40	$5	$45	2026Q4	9.3%	$44	$5	$49
5.0%	Engineering During Construction	$250	$30	12.0%	$280		$250	$30	$280	2026Q4	9.3%	$273	$33	$306
1.8%	Planning During Construction	$90	$11	12.0%	$101		$90	$11	$101	2025Q4	6.0%	$95	$11	$107
6.0%	Adaptive Management & Monitoring	$300	$36	12.0%	$336		$300	$36	$336	2029Q2	17.9%	$354	$42	$396
1.0%	Project Operations			12.0%										
31	CONSTRUCTION MANAGEMENT													
9.5%	Construction Management	$477	$57	12.0%	$534		$477	$57	$534	2026Q4	9.3%	$521	$63	$584
1.0%	Project Operation:	$50	$6	12.0%	$56		$50	$6	$56	2026Q4	9.3%	$55	$7	$61
1.0%	Project Management	$50	$6	12.0%	$56		$50	$6	$56	2026Q4	9.3%	$55	$7	$61
	CONTRACT COST TOTALS:	$7,089	$1,921		$9,010		$7,089	$1,921	**$9,010**			$7,647	$2,067	**$9,714**

Design Maturity Determination for Cost Certification

Date: 3/1/24

P2 Designation/Project Name: GLFER 506 Conneaut Creek Sea Lamprey Barrier 495058

The Chief of Engineering is responsible for the technical content and engineering sufficiency for all engineering products produced by the command. As such, I have performed the Management Control Evaluation per Engineer Regulation (ER) 1110-2-1150, Engineering and Design for Civil Works Projects, Appendix H, Internal Management Control Review Checklist.

The current design DOES NOT require HQ approval (i.e., engineering waivers), requiring a deviation from mandatory requirements and mandatory standards, as defined in ERs, Engineering Manuals, Engineering Technical letters, and Engineering Circulars.

The current hydrology and hydraulics modeling is at 50 % design maturity, per reference (h) below.

The current geotechnical data and subsurface investigations are at 10 % design maturity, per reference (h) below. Subsurface investigations shall also include investigations of potential borrow and spoil areas.

The current survey data is at 50 % design maturity, per reference (h) below.

Other major technical and/or scope assumptions and risks include the following, which will be refined as the design progresses.

• A great risk for this project is non-technical and related to real estate acquisition. The team has invested most of its resources into establishing an adequate hydraulic model for the selected plan to show the parcels affected by the project. Given this risk the team believes that more detailed design during feasibility is not warranted.

The aggregate for all features is 30 % design maturity. Therefore, per the CECW-EC memorandum dated 05-June-2023, I certify that the design deliverables used to generate the cost products for this project and the estimate meet the requirements for a CLASS 3 estimate, as per reference (a) below. Design risks, impacts and remaining efforts are summarized on page 2.

Considering risks and assumptions noted above, along with all other concerns documented in the Risk Register, the Cost and Schedule Risk Analysis has developed a contingency of 32 % at the 80 % confidence level for the defined project scope.

Chief of Engineering & Construction

David Conboy P.E., PMP

Printed Name

CONBOY.DAVID.JOSEPH.1014868786

Digitally signed by CONBOY.DAVID.JOSEPH.1014868786
Date: 2024.03.04 10:50:25 -05'00'

Signature

Design Maturity Determination for Cost Certification, Remaining Work

If an engineering waiver is required, list the risks and remaining design work needed to mitigate this issue in the current design. Identify remaining effort to complete the design required for 100% design.

• A design waiver is not required due to the level of investigations done by the PDT. Each alternative has been meticulously weighed to ensure a right fit to achieve the goal of the project without negatively impacting the ecosystem or local residential structures.

Identify remaining effort to complete geotechnical design effort required for 100% design. List the risks and cost and schedule impacts needed to mitigate this issue in the current design.

• Review preliminary plans of proposed structure developed by civil/structural.
• Conduct geotechnical analyses and evaluations.
• Plan and execute a geotechnical investigation and testing program.
• Prepare a geotechnical appendix for the DDR.
• Unknowns associated with the current lack of civil/structural design and lack of geotechnical site information include but are not limited to the following: 1) the required barrier and abutment wall foundation depths, 2) the need for excavation and/or corrective measures to provide a suitable foundation for proposed berms, 3) availability of suitable berm fill, and 4) the need for provisions to prevent negative impacts to existing bridge components.
• The impacts to cost as a result are as follows: 1) Higher Excavation and concrete costs. 2) Possibly requiring a more complex anchoring system for both the barrier and wingwalls 3) Purchasing and delivering fill from off-site. 4) Reinforcement or repairing current nearby infrastructure.
• To mitigate significant cost risks, an abbreviated risk analysis (ARA) was performed and appropriate contingency is being included. Sufficient time will need to be included in the final design schedule to accommodate the necessary geotechnical tasks. All cost impacts have been addressed in the ARA.

Identify remaining effort required to complete H&H required for 100% design. List the risks and cost and schedule impacts needed to mitigate this issue in the current design.

• Perform fishway calculations and design fishway geometry.
• Update the final sea lamprey barrier design into 1D HEC-RAS model to finalize flood impacts associated with the design.
• Submit LOMR.
•Current flood impact analysis shows an increase associated with the barrier, however no structures or dwellings are impacted. Real estate risks exist due to flowage easement requirements associated with the increased inundation.
• We just received TSP approval from LRD, with a trap and sort operation being implemented for the final design. The trap and sort facility has been costed already and H&H inputs to the design of this facility have low risk to significantly increase cost. The incorporation of the trap and sort facility will likely have no impacts to our calculated WSE's and the takings analysis, which was performed based on a permanent inundation associated with the permanent (seasonal) impoundment and directly correlated to the barrier crest elevation. Therefore, there is little risk for remaining H&H analyses resulting in major design changes and associated costs.

Identify remaining effort needed to complete survey data required for 100% design. List the risks and cost and schedule impacts needed to mitigate this issue in the current design.

• Detailed survey of the selected barrier site upland areas and river cross sections are needed to supplement aerial LIDAR sources and the cross sections surveyed for hydraulic modeling near the selected project site. Survey used to this point is appropriate for feasibility and evaluating a number of barrier locations, but further detail would be expected for detailed design.
• Engineering judgement and experience has been used to fill in the missing survey data. Survey will be required to help finalize barrier placement location, wingwall and berm tie-in.
• The cost impacts concerning the statements above will determine final quantities with the associated concrete for both the barrier, wingwalls and fill volume for the berm.
• To mitigate significant cost risks, an abbreviated risk analysis (ARA) was performed and appropriate contingency is being included. Sufficient time will need to be included in the final design schedule to accommodate the necessary survey tasks. All cost impacts have been addressed in the ARA.

If the project is anticipated to be executed in parts, provide a design assessment (percent complete) of each part/phase below.

• Feasibility, 75% Complete
• Design Documentation Report, 0%.
• Design Plans and Specifications, 0%.

References:

a. ER 1110-2-1302 – Civil Works Cost Engineering
b. CECW-EC memorandum dated 05-June-2023MFR, Guidance on Cost Engineering Products update for Civil Works Projects in accordance with Engineer Regulation 1110-2-1302 – Civil Works Cost Engineering
c. ER 1165-2-217 – Civil Works Review Policy
d. ER 1110-2-1150 – Engineering and Design for Civil Works Projects
e. ER 1110-3-12 – Quality Management
f. ER 1110-345-700 – Design Analysis, Drawings and Specifications
g. EM 5-1-11 – Project Delivery Business Process (PDBP)
h. Engineering and Construction Bulletin (ECB) 2023-9 – Civil Works Design Milestone Checklists

Design Maturity Determination for Cost Certification – Instructions

Paragraph 1 – Design Date: Use the drop-down menu to populate the date of the design.

Paragraph 1 – Project Information: Enter the P2 Project number and Project name.

Paragraph 3 – Engineering Waivers: Use the drop-down menu to populate this field with either "Does," or "Does not." If an engineering waiver is needed, or anticipated to be needed, provide the specific waiver required for the Project. A waiver is any deviation from current mandatory standards, as indicated.

Paragraph 4 – Hydrology and Hydraulics: Populate this field with the % design maturity.

Paragraph 5 – Geotechnical Information: Populate this field with the % design maturity.

Paragraph 6 – Survey Data: Populate this field with the % design maturity.

Paragraph 7 – Other Technical Assumptions and/or Scope: Enter any other major technical assumptions or scope assumptions here. Only include assumptions that pertain to design. Template discussion fields are provided as a courtesy. Please include additional pages as necessary.

Paragraph 8 – Signature: Print the name and title and provide the signature for the District's Chief of Engineering. This authority cannot be delegated; however, the Deputy Chief of Engineering and Design may sign the form in the absence of the Chief of Engineering. All fillable fields must be populated (use N/A if not applicable) in order for the document to be signed.

Page 2 – Remaining Work: Identify the current baseline design assumptions and the remaining design effort and risks to complete 100% design for the authorized project. If the project is to be broken into parts or phases, provide details on the aggregate design level of each phase and anticipated timeline for completion.

This form is required for all Civil Works projects for initial Cost Certification and Recertification, based on Policy Clarification MFR dated 05 June 2023, *Guidance on Cost Engineering Products update for Civil Works Projects in accordance with Engineer Regulation 1110-2-1302 – Civil Works Cost Engineering*.
The Point of Contact for this action is Mr. Mukesh Kumar, Cost Engineering Community of Practice Leader, CECW-EC, Mukesh.Kumar@usace.army.mil.
Version 1: 01 October 2023.

US Army Corps of Engineers®
Buffalo District

CONNEAUT CREEK SEA LAMPREY BARRIER PROJECT
P2# 495058

Section 506 – Water Resources Development Act of 1992, as amended Great Lakes Fishery and Ecosystem Restoration

Erie County, Pennsylvania

Appendix A-5:
Monitoring & Adaptive Management Plan

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1 INTRODUCTION

Section 2039 of WRDA 2007 directs the Secretary of the Army to ensure, that when conducting a feasibility study for a project (or component of a project) under the Corps ecosystem restoration mission, that the recommended project includes a monitoring plan to measure the success of the ecosystem restoration and to dictate the direction adaptive management should proceed, if needed. This monitoring and adaptive management plan shall include a description of the monitoring activities, the criteria for success, and the estimated cost and duration of the monitoring as well as specify that monitoring will continue until such time as the Secretary determines that the success criteria have been met. Section 2039 of WRDA 2007 also directs the Corps to develop an adaptive management plan for all ecosystem restoration projects. The adaptive management plan must be appropriately scoped to the scale of the project. The information generated by the monitoring plan will be used by the District in consultation with the Federal and State resources agencies and the Major Subordinate Command (MSC) to guide decisions on operational or structural changes that may be needed to ensure that the ecosystem restoration project meets the success criteria.

An effective monitoring program for a project is necessary to properly assess the status and trends of applicable ecological functions that are forecast through implementation of the selected plan. Assessing status and trends includes both spatial and temporal variations. Gathered information under this monitoring plan will provide insight into the effectiveness of restoration measures and adaptive management strategies, and indicate where goals have been met, if actions should continue, and/or whether more aggressive management is warranted. Monitoring changes at a project site is not a simple task. Ecosystems, by their very nature, are dynamic systems where populations of macroinvertebrates, fish, birds, and other organisms fluctuate with natural cycles. Water quality also varies, particularly as seasonal and annual weather patterns change. The task of tracking environmental changes can be difficult, and distinguishing the changes caused by human actions from natural variations can be even more difficult. For this reason, a focused monitoring protocol tied directly to the planning objectives needs will be followed.

This monitoring plan describes the existing habitats and monitoring methods that could be utilized to assess the project's performance. By reporting on environmental changes, the results from this monitoring effort will be able to evaluate whether measurable results have been achieved and whether the intent of this Section 506 project is being met. Furthermore, it will provide important data to inform adaptive management actions.

1.1 GUIDANCE

The following documents provide distinct Corps policy and guidance that are pertinent to developing this monitoring plan:

a. Section 1161 of WRDA 2016 and Section 2039 of WRDA 2007. Implementation guidance for these authorities was provided in 19 Oct 2017 Memo and is summarized as follows.
    a. Section 1161 of WRDA 2016 amended Section 2039.
    b. Section 2039 of WRDA 2007, as amended, directs the secretary to ensure that,

when conducting a feasibility study for a project (or component of a project, for ecosystem restoration, the recommended project includes a plan for monitoring the success of the ecosystem restoration. The monitoring plan shall include a description of:

i. Types and number of restoration activities to be carried out;
ii. Physical action to be undertaken to achieve project objectives;
iii. Functions and values that will result from the restoration plan;
iv. Monitoring activities to be carried out;
v. Criteria for ecosystem restoration success;
vi. Estimated cost and duration of the monitoring; and
vii. A contingency plan for taking corrective actions in cases in which the monitoring demonstrates that restoration measures are not achieving ecological success in accordance with the criteria described in the monitoring plan.

c. The monitoring plan will also specify that the monitoring will continue until such a time as the Secretary determines that the success criteria will be met. Within a period of 10 years from completion of construction of an ecosystem restoration project, monitoring will be a cost-shared project cost. Any additional monitoring required beyond 10 years will be a non-federal responsibility.
d. Upon completion of construction of an ecosystem restoration project, monitoring for ecological success will be initiated. Once ecological success has been documented by the district engineer in consultation with the federal and state resource agencies, no further monitoring will be required.
e. An adaptive management plan addresses unforeseen changes in site conditions or other components of the restoration projects and will be developed for all ecosystem restoration projects. The adaptive management plan will guide decisions for refining and revising restoration activities and implementing measures to address both foreseeable and unforeseen circumstances that adversely affect restoration success.
f. If the results of the monitoring program support the need for physical modifications to the project, the cost of the changes will be cost shared with the non-federal sponsor and must be concurred with by the non-federal sponsor.

b. Engineering Pamphlet (EP) 1105-2-58, Section 24, summarizes the guidance previously documented in the Section 1161 of WRDA implementation guidance.

1.2 General Monitoring Objectives

As presented in the national USACE document "Guidance on Monitoring Ecosystem Restoration Projects" released 12 January 2010, the following are general project monitoring objectives:

- To determine and prioritize needs for ecosystem restoration.
- To support adaptive management of implemented projects.
- To assess and justify adaptive management expenditures.
- To minimize costs and maximize benefits of future restoration projects.
- To determine "ecological success", document and communicate it.
- To advance the state of ecosystem restoration practice.

1.3 PROJECT AREA DESCRIPTION

The Griffey Road Bridge is located roughly 3.0 river miles upstream from the Pennsylvania/Ohio state line. A sea lamprey barrier at this site would be placed just downstream of the bridge as shown in Figure 1. The barrier would utilize the existing bridge abutment on the right of bank and tie into a steep, exposed shale wall on the left of bank. Placing the barrier here helps minimize impacts to the water surface elevation (WSE) due to the significant encroachment to the floodplain already created by the Griffey Road bridge. The roadway embankment is already loaded during out of bank flow events but may need additional protection for seepage or permanent loading at toe of embankment due to a sea lamprey barrier. The parcel downstream of Griffey Road on the right of bank is owned by the project sponsor Pennsylvania Fish and Boat Commission (PFBC); therefore, additional access and real estate benefits may exist at this site.

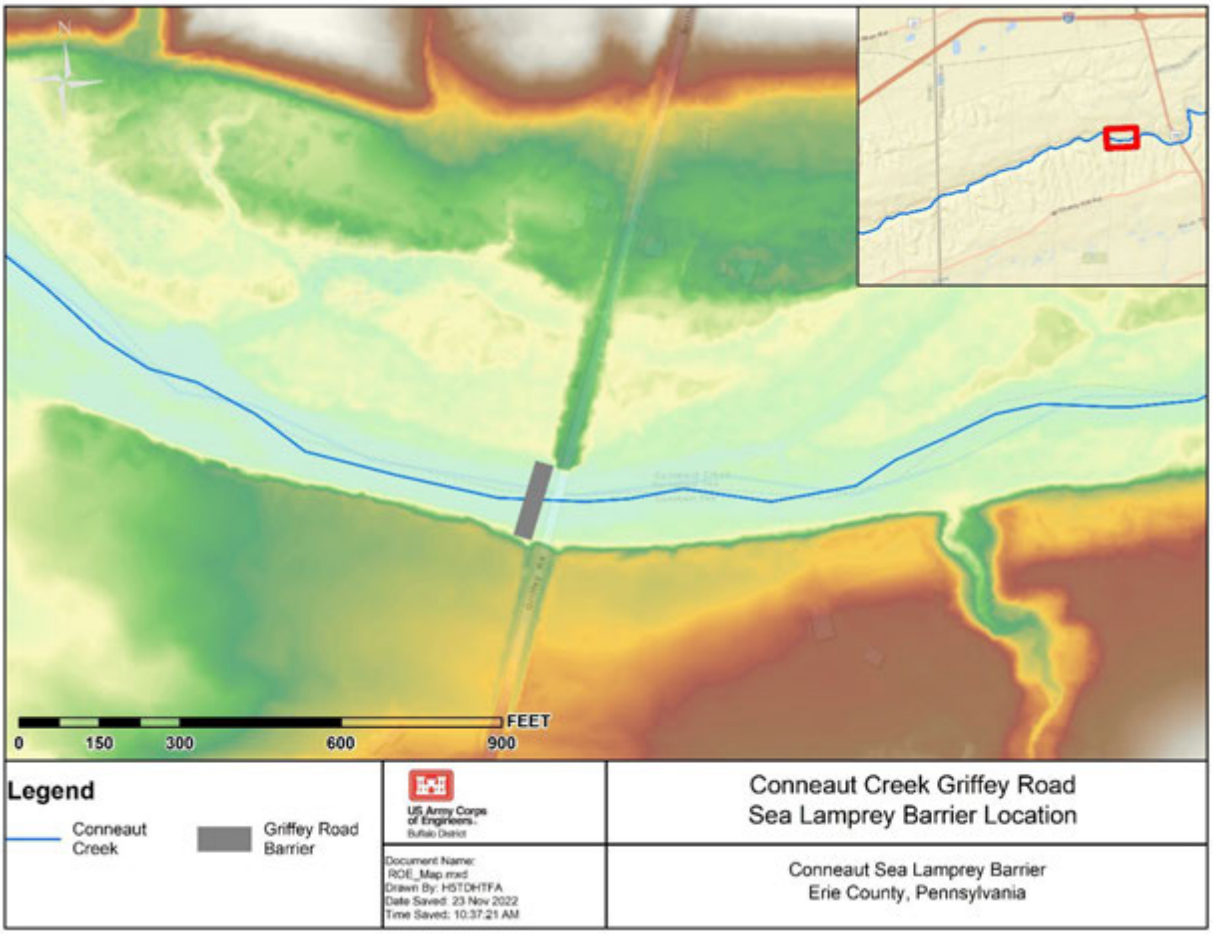


Figure 1. Griffey Road Sea Lamprey Barrier Location

1.4 RESTORATION DESIGN OVERVIEW

It is recommended that a seasonally operated adjustable low crest barrier that uses an Obermeyer gate and electrical barrier with trap and sort and jumping pool (Alternative 4a) at Griffey Road be chosen to provide more efficient and effective means to prevent or significantly reduce the numbers of sea lamprey from reaching spawning habitat in Conneaut Creek. This alternative was identified as the best buy alternative and returned the greatest average annual habitat units by balancing need for an effective sea lamprey barrier while minimizing impacts to the natural system. Additionally, Alternative 4a ranked highest in terms of the four evaluation criteria USACE uses to screen alternative plans (i.e., acceptability, completeness, effectiveness, and efficiency).

Alternative 4a will effectively limit sea lamprey migration into Conneaut Creek, thereby reducing or eliminating the need for lampricide treatments. Reductions in the use of lampricide will protect native species from potential impacts of this chemical while still protecting the Lake Erie fishery from negative impacts associated with sea lamprey invasion. Furthermore, implementation of a barrier on Conneaut Creek will protect the East Branch of Conneaut Creek from sea lamprey invasion should the Bessemer Dam fail. This protection will also benefit the northern brook lamprey population in the East Branch by preventing the need for TFM application in the tributary.

Alternative 4a will also result in positive economic impacts to the Great Lakes Region. By eliminating the need for lampricide treatments in Conneaut Creek, Alternative 4a will result in a cost savings for USFWS, who currently treats Conneaut Creek with lampricide every three to five years. Reduction of the sea lamprey population and associated impacts on fish species will result in positive benefits to commercial fishing, including recreational and sport fishing.

Compared to other alternatives, Alternative 4a also effectively limits sea lamprey migration while minimizing impacts to property owners along Conneaut Creek. Alternative 4a utilizes a seasonally operated low crest barrier to limit sea lamprey migration. The low crest height minimizes upstream inundation and avoids creation of a life safety risk that may result from taller barriers. Seasonal operation of Alternative 4a also allows the barrier to be lowered to the streambed outside of the sea lamprey migration season, returning Conneaut Creek to uninhibited flow conditions. When the barrier is lowered, associated inundation on upstream properties will return to preconstruction conditions. As such, Alternative 4a maximizes ecological benefits while minimizing burdens to upstream property owners.

The site selected for the sea lamprey barrier is the Griffey Road location just downstream of the bridge over Conneaut Creek (Figure 2). This location has a shale creek bottom that is expected to be excavatable by typical construction equipment. The project area is underlain by the Devonian age Chadakoin Formation, which is composed of siltstone and some sandstone, interbedded with shale (refer to Appendix A-3 for full details). Geotechnical borings were performed by PADOT in 1948 were extended to refusal in bedrock likely composed of limestone or siltstone, both competent bedrock for the barrier foundation. Further investigations related to the soil and rock on site will be conducted during the detailed design phase for this project.

As proposed, the barrier would tie into the existing Griffey Road bridge abutment and embankment on the right bank. The existing bridge abutment and embankment, along with the adjustable barrier, would serve to impound water to achieve a difference in upstream and downstream water levels. PADOT will need to approve such use of these structures and an engineering evaluation will be

needed to ensure that they will not be negatively impacted.

The site is accessible from right side bank from property owned by the State of Pennsylvania. This allows for permanent access to one side of the barrier. The left side bank is owned by an individual amenable to the project. These factors along with the hydrology discussed in Appendix A-2 make this the most feasible site for the lamprey barrier.

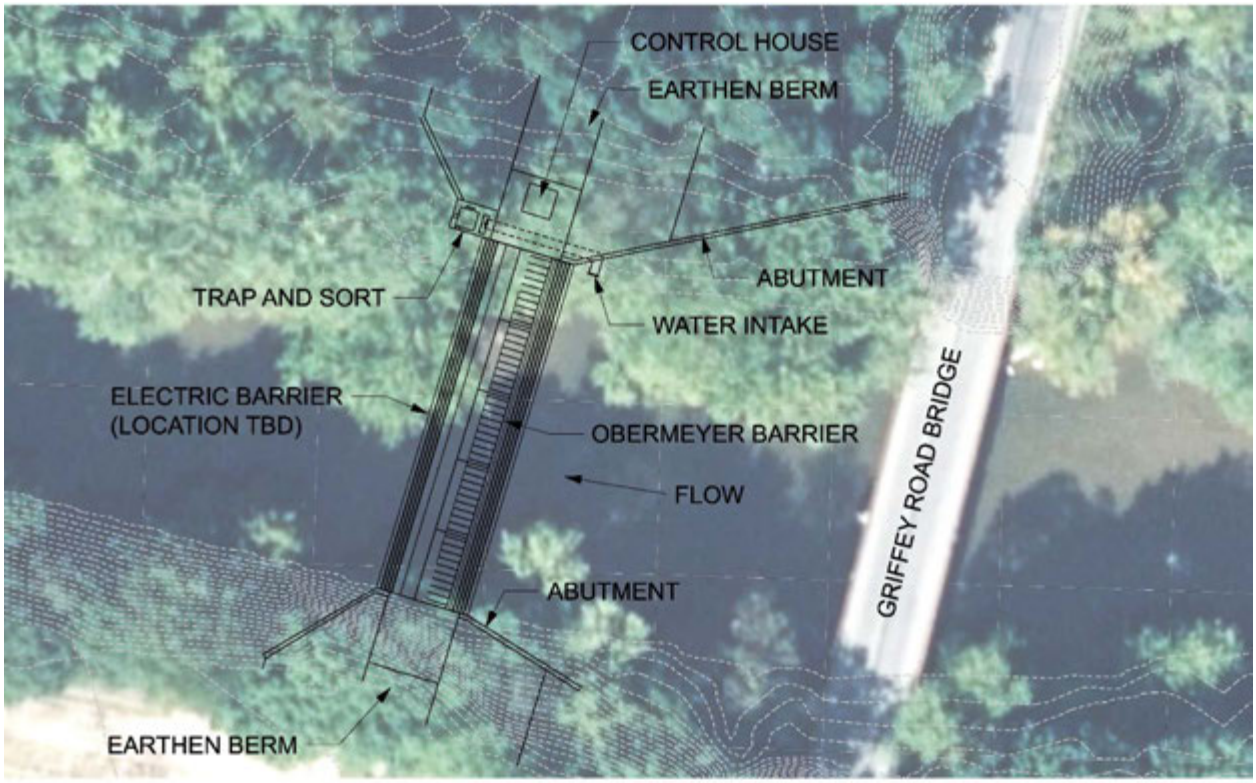


Figure 2: Planview of approximate location and design details of the recommended plan

An Obermeyer or adjustable crest barrier in combination with electric barrier is the selected alternative. Several factors were weighed in making this selection and are described in detail through this report. The adjustable crest barrier will be approximately 5 feet in height above the current creek bed. This is based on hydraulic modeling discussed in detail in Section 3.5 and associated appendix (Appendix A-2). The barrier will be roughly 110 feet wide not including the abutments at each bank. The intent is for the barrier to match the existing bank to bank width of the creek at the selected location. During the detailed design phase, the design team will consider the best location for the electric barrier, measures to prevent fish mortality under the adjustable crest barrier, and bracing details for the adjustable crest to ensure the barrier functions as intended.

Trap and sort will be used to pass fish and remove lamprey. A slotted fishway will also be considered during the detailed design phase. Currently the plan is to not include a fishway for fish passage. The barrier will be lower to approximately match the current creek bottom when lamprey are not running upstream. This will allow other fish species to pass the barrier during different times of the year. A jumping pool may also be included with the barrier. The size and effectiveness of a jumping pool will be investigated during the detailed design phase.

Conneaut Creek is used for paddle sports and portage features will be looked at during the detailed

design phase. The current plan is for users to pull out of the water before reaching the barrier, make their way up to the road, cross Griffey Road and then return to the creek (Figure 3). Features such as ramps, stairs, etc. will be considered.

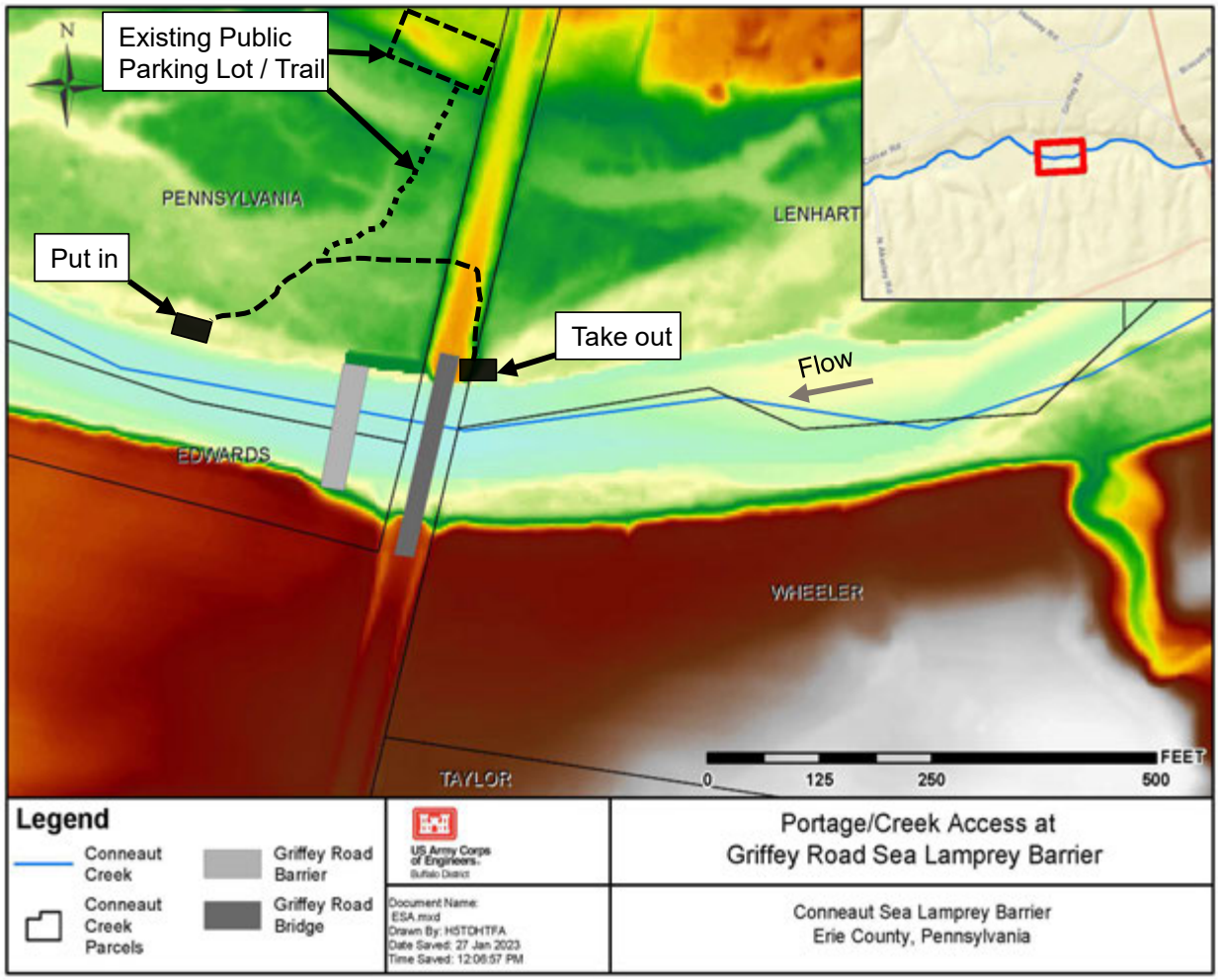


Figure 3: Portage at Griffey Road Sea Lamprey Barrier

2 MONITORING COMPONENTS

2.1 MONITORING PLAN GOALS AND OBJECTIVES

Monitoring is necessary to determine if the objectives of the Project are achieved. Project objectives as listed in the Detailed Project Report include:

1. Prevent or significantly reduce the number of sea lamprey from reaching approximately 50 miles of spawning habitat in Conneaut Creek.

2. Improve the efficiency and effectiveness of sea lamprey management on Conneaut Creek, while reducing the need to use lampricide, thereby reducing the negative impacts to native species in Conneaut Creek.

3. Maintain or improve the stream habitat quality for desirable fish species.

Baseline ecological conditions and future with and without project conditions are documented in detail in the Detailed Project Report. The following specific performance metric is established for monitoring the effectiveness of this project:

1. Monitoring of the effectiveness of the barrier to blocking movement of sea lamprey upstream of Griffey Road.

2. Monitoring successful passage of native fish passage during the sea lamprey run.

3. Monitoring wetland acreage and quality using the Ohio Rapid Assessment Method (ORAM) upstream of the barrier between Griffey Road and SR-6N

4. Monitoring stream quality upstream of the barrier using the USEPA Rapid Bioassement Protocols (RBP) - Habitat Assessment between Griffey Road and SR-6N.

5. Calculate habitat units for the with-project condition to determine if there is a significant uplift in habitat units when compared to without project condition as was predicted from the ecological output analysis.

In order to evaluate the overall effectiveness of the project and to determine if the specific objectives are met, the project will be monitored for a period of up to 10 years to collect information pertaining to lamprey populations, fish community, wetland and stream quality.

2.2 OHIO ENVIRONMENTAL PROTECTIONAGENCY (OEPA) OHIO RAPID ASSESSMENT METHODOLOGY (ORAM) FOR WETLANDS AND US EPA RAPID BIOASSESSMENT PROTOCOLS (RBP) - HABITAT ASSESSMENT

The ORAM is a rapid assessment of wetland quality comprised of a narrative rating and quantitative rating. The narrative rating portion directs the assessor through a series of questions to determine if the wetland is likely of poor quality (Category 1) or high quality (Category 3). The narrative rating

utilizes known information sources, like threatened and endangered species databases. Conclusions derived from the narrative rating should be verified by completing the quantitative rating. The quantitative rating considers six metrics: size; upland buffers and surrounding land use; hydrology; habitat alteration and development; special wetland communities; and vegetation, interspersion, and microtopography. Metrics may include submetrics to assess wetland characteristics in more detail and calculate a more accurate score. To calculate the ORAM score, the assessor reviews wetland conditions, selects the appropriate score for each submetric, and calculates the total for each metric. The ORAM is based on a 100-point score, and wetlands are grouped into three categories based on quality. Category 1 wetlands (scores of 0-29.9) are considered lowest quality, while Category 3 wetlands (scores of 65-100) are considered highest quality. Wetlands delineated within the Project Area were assessed using the ORAM methodology and assigned a score of 84, meaning wetlands likely to be impacted by alternatives are Category 3. Additional information regarding wetland delineation and assessment is provided in Appendix A-6.

The US EPA RBP – Habitat Assessment is a rapid assessment of instream and riparian habitat, which influences the aquatic community. The US EPA RBP – Habitat Assessment includes a general description and physical characterization of the site, water quality assessment, and visual assessment of habitat quality. Data collected as part of the physical characterization and water quality assessment include land use, stream origin, stream type, channel width, channel depth, flow, substrate, water quality (e.g., temperature, dissolved oxygen, turbidity, etc.), riparian buffer width, riparian vegetation, presence of dams or large woody debris, and aquatic vegetation. The visual assessment of habitat quality uses different parameters for high-gradient and low-gradient streams to account for differences in habitat and substrate between the two types of streams. The visual assessment includes evaluation of the epifaunal substrate or available cover, embeddedness (high-gradient) or pool substrate characterization (low-gradient), velocity/depth combinations (high-gradient) or pool variability (low-gradient), sediment deposition, channel flow status, channel alteration, frequency of riffles or bends (high-gradient) or channel sinuosity (low-gradient), bank stability, bank vegetative protection, and riparian vegetative zone width. Each parameter is assigned a score between 0-20, with scores corresponding to higher quality habitat. The scores for each parameter are summed and compared against a reference condition to determine the final habitat ranking. Conneaut Creek within the Project Area was assessed using the US EPA RBP – Habitat Assessment methodology and assigned a score of 169, meaning the habitat quality in the affected stream reach is considered optimal. Additional information regarding stream assessment is provided in Appendix A-6.

To assess the future condition with the barrier project, ORAM and RBP scores were estimated during the feasibility study that were believed could be attained in the temporary inundation area upstream of the dam over the first 50 years following completion of each restoration alternative. This was done by examining each restoration alternative proposal narrative and plan drawings and estimating ORAM and RBP scores based on the proposed specifications. These scores now represent the targets for each restoration alternative. The existing scores were then compared to the predicted scores for the sites to help determine potential ecological benefits of each alternative. The success criteria and baseline score for this metric is included in Table 1. This monitoring shall occur on a bi-yearly basis.

Table 1. ORAM/RBP Methodology

Monitoring Metric	Methodology	Baseline Score	Success Criteria
ORAM/RBP	Field visit and ORAM/RBP	84/168	60/137

Adaptive Management: if success criteria and trajectory of ecosystem recovery is not trending towards achieving the success criteria:

1. Place more small gravel or larger boulders to create more habitat. Also consider additions of coarse woody debris to improve structural habitat
2. Consider planting in wetland areas

2.3 FISH MONITORING

Trapping of lamprey will occur throughout the sea lamprey run.

Table 2. Fish Monitoring

Monitoring Metric	Methodology	Baseline Score	Success Criteria
Fish Monitoring	Traps and electrofishing	-	1. Reduction of movement of sea lamprey past Griffey Road by trap data and reduction of larval lamprey populations upstream of barrier such that frequency of lampricide treatments are reduced or eliminated. 2. Movement of native fish above barrier through trap and sort operation.
Adaptive Management: if success criteria and trajectory of reduction in sea lamprey movement above Griffey Road is not trending towards achieving the success criteria: 1. Consider making adjustments to barrier, entrance to trap, trap itself or attraction flows.			

2.4 MONITORING RESPONSIBILITY AND FREQUENCY

Monitoring responsibilities for the first 10 years after physical construction is complete will be cost shared with the non-federal sponsor. The monitoring can be performed by USACE or its partners. Monitoring beyond that time will be the responsibility of the local sponsor. If the success criteria have been adequately achieved and appear to be stable, the non-federal sponsor and USACE can agree to terminate additional monitoring requirements.

2.5 DATA ANALYSIS AND REPORTING

All data collected each year will be complied by USACE and documented in a yearly monitoring report. The yearly monitoring report should include the data collected, an analysis of the current year data, and an analysis of trends inferred from previous year data. The data should also be compared to the success criteria and used to make a clear determination of whether or not the success criteria have been achieved. If the trends in the data indicate the success criteria have not been achieved, or habitat function or quality is decreasing, adaptive management actions may be taken.

2.6 MONITORING COST AND SCHEDULE

For GLFER projects, monitoring is costs-shared for the first 10 years after completion of physical construction. The cost of such monitoring is included in total project costs and shared with the non-federal sponsor and will not exceed one percent of the costs included in total project costs for the features that are to be monitored minus the costs for monitoring (Reference: ER 1105-2-100, Appendix F, Amendment #2, 31 Jan 07). Although not expected, a waiver would be needed in order to increase either of these limits (costs or duration).

The non-federal sponsor will be responsible for performance of OMRR&R during the monitoring period. Estimated monitoring costs are presented

A preliminary monitoring schedule is shown in Table 4. The total cost of monitoring over the entire 10-year period is estimated at approximately $300,000.

Table 3. Preliminary Monitoring Schedule

Monitoring Activity	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
ORAM/RBP			X		X		X		X		X
Fish Sampling		X	X	X	X	X	X	X	X	X	X
Monitoring Reprort		X	X	X	X	X	X	X	X	X	X

Table 4. Preliminary Cost for Odd Years

Activity	Time to complete	Number of Personnel	Hourly rate	Cost
Fish Sampling	100	2	$100/hr	20,000
ORAM				
RBP				
Data analysis	10	1	$100/hr	$1,000
Monitoring report	40	1	$100/hr	$4,000
Total				**$25,000**

Table 5. Preliminary Cost for Even Years

Activity	Time to complete	Number of Personnel	Hourly rate	Cost
Fish Sampling	100	2	$100/hr	20,000
ORAM	25	2	$100/hr	$5,000
RBP	25	2	$100/hr	$5,000
Data analysis	10	1	$100/hr	$1,000
Monitoring report	40	1	$100/hr	$4,000
Total				**$35,000**

3 ADAPTIVE MANAGEMENT PLANNING

Adaptive management is an approach during project monitoring to allow for the quick identification and management of unforeseen problems in a project being able to achieve its intended purpose. It can also be defined as an iterative approach to managing ecosystems, where the methods of achieving the desired objectives are unknown or uncertain. In essence, adaptive management provides a formalized process for the management of an ecosystem restoration project. Such a process is useful for the following reasons:

- Mistakes may be made during construction of the restoration project. Someone will need to determine if the mistakes need to be corrected, whether they are acceptable, or whether they enhance the site.
- Unexpected detrimental events may alter the site, requiring consideration of corrective measures. For example, a large flood event may damage components of the barrier which would require a repair or improvement of failed component to reduce chances of failure in the future.
- Experiments or trials using different methods may be needed to clarify techniques on how to achieve one or more restoration measures. Decisions will be required on how to meet the performance standards set forth, or if the performance standards should be altered.

Monitoring in an adaptive management context focuses on early identification of undesirable trends and provides the guidance necessary to determine the appropriate remedial action to reverse an undesirable situation or trend. Adaptive management actions may entail either modification of the components of the barrier and/or operation of the barrier described in the tables 1-3 of the previous section. These actions would be in coordination with the non-federal Sponsor.

The monitoring metrics established in Section 2 will be used during adaptive management as performance metrics to assess the success of the implemented project and identify aspects of the project that may require corrective action. These are similar metrics that were initially used in the evaluation of various restoration alternatives. The consistent use of the same suite of metrics will allow the initial ecological benefit predictions to be compared to the actual project response.

US Army Corps of Engineers®
Buffalo District

CONNEAUT CREEK SEA LAMPREY BARRIER PROJECT
P2# 495058

Section 506 – Water Resources Development Act of 1992, as amended Great Lakes Fishery and Ecosystem Restoration

Erie County, Pennsylvania

Appendix A-6:
Environmental

MEDIA ADVISORY

U.S. ARMY CORPS OF ENGINEERS
Buffalo District

Building Strong®

For Immediate Release:
May 10, 2022

Contact: Avery Schneider, Public Affairs
716.879.4410 or 716.628.1498 (cell)
avery.p.schneider@usace.army.mil

Public Meeting for Conneaut Creek Ecosystem Restoration Project

BUFFALO, NY — The public is invited to an information meeting for area residents and stakeholders along Conneaut Creek to learn more about a study of potential barriers for the invasive sea lamprey.

A barrier would prevent or significantly reduce the numbers of sea lamprey from reaching nearly 50 river miles of Conneaut Creek where they currently reproduce and mature before returning to Lake Erie.

WHEN: Tuesday, May 24, 2022, 6:00–8:00 p.m.

WHERE: Northwestern High School cafeteria, 200 Harthan Way, Albion, PA 16401

WHO: Representatives from the U.S. Army Corps of Engineers, Buffalo District, Pennsylvania Fish and Boat Commission, Great Lakes Fishery Commission, U.S. Fish and Wildlife Service, Pennsylvania Department of Environmental Protection, Pennsylvania Sea Grant, and Ohio Department of Natural Resources

Attendees are asked to R.S.V.P. to ConneautCreekGLFER@usace.army.mil prior to the meeting.

Sea lampreys are primitive fish that feed on the body fluids of other fish. Native to the Atlantic Ocean, these parasitic fish entered the Great Lakes through man-made shipping canals and quickly colonized the entire Great Lakes. Sea lampreys are an incredibly destructive invasive species, capable of killing up to 40 pounds of fish every year.

-more-

MEDIA ADVISORY

This project is being executed under the Corps of Engineers' Great Lakes Fishery Ecosystem Restoration program, and is cost-shared between the U.S. Army Corps of Engineers and Great Lakes Fishery Commission. The Great Lakes Restoration Initiative provides the federal funding. The study is investigating the feasibility of implementing a permanent sea lamprey control barrier in Conneaut Creek, Pennsylvania.

More information on the GLFER program can be found here: https://www.lrd.usace.army.mil/Home/Great-Lakes-Fishery-Ecosystem-Restoration-Program/

The Buffalo District delivers world class engineering solutions to the Great Lakes region, the Army and the Nation to ensure national security, environmental sustainability, water resource management, and emergency assistance during peace and war.

-30-

U.S. Army Corps of Engineers, Buffalo District
1776 Niagara Street, Buffalo, NY 14207-3199
www.lrb.usace.army.mil

Public Meeting:
Conneaut Creek Sea Lamprey Barrier

Section 506 Great Lakes Fishery and Ecosystem Restoration

Location: Northwestern Senior High School cafeteria, 200 Harthan Way, Albion, PA 16401

Time: Tuesday, May 24, 2022 from 6-8pm

U.S. Army Corps of Engineers, Buffalo District in partnership with Pennsylvania Fish and Boat Commission, Great Lakes Fishery Commission, U.S. Fish and Wildlife Service, Pennsylvania Department of Environmental Protection and others, is investigating the feasibility of implementing a permanent sea lamprey control barrier in Conneaut Creek, Pennsylvania. **The public is invited to learn more about the study and offer input.**

Sea lampreys are primitive fish that feed on the body fluids of other fish. Native to the Atlantic Ocean, these parasitic fish entered the Great Lakes through man-made shipping canals and quickly colonized the entire Great Lakes. Sea lampreys are an incredibly destructive invasive species capable of killing up to 40 pounds of fish every year. A barrier would prevent or significantly reduce the numbers of sea lamprey from reaching nearly 50 river miles of Conneaut Creek where they currently reproduce and mature before returning to Lake Erie.

Please R.S.V.P. to: ConneautCreekGLFER@usace.army.mil

US Army Corps of Engineers
Buffalo District

pennsylvania
FISH AND BOAT COMMISSION

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

OHIO
DIVISION OF WILDLIFE

Sea Grant
Pennsylvania

Conneaut Creek Sea Lamprey Barrier

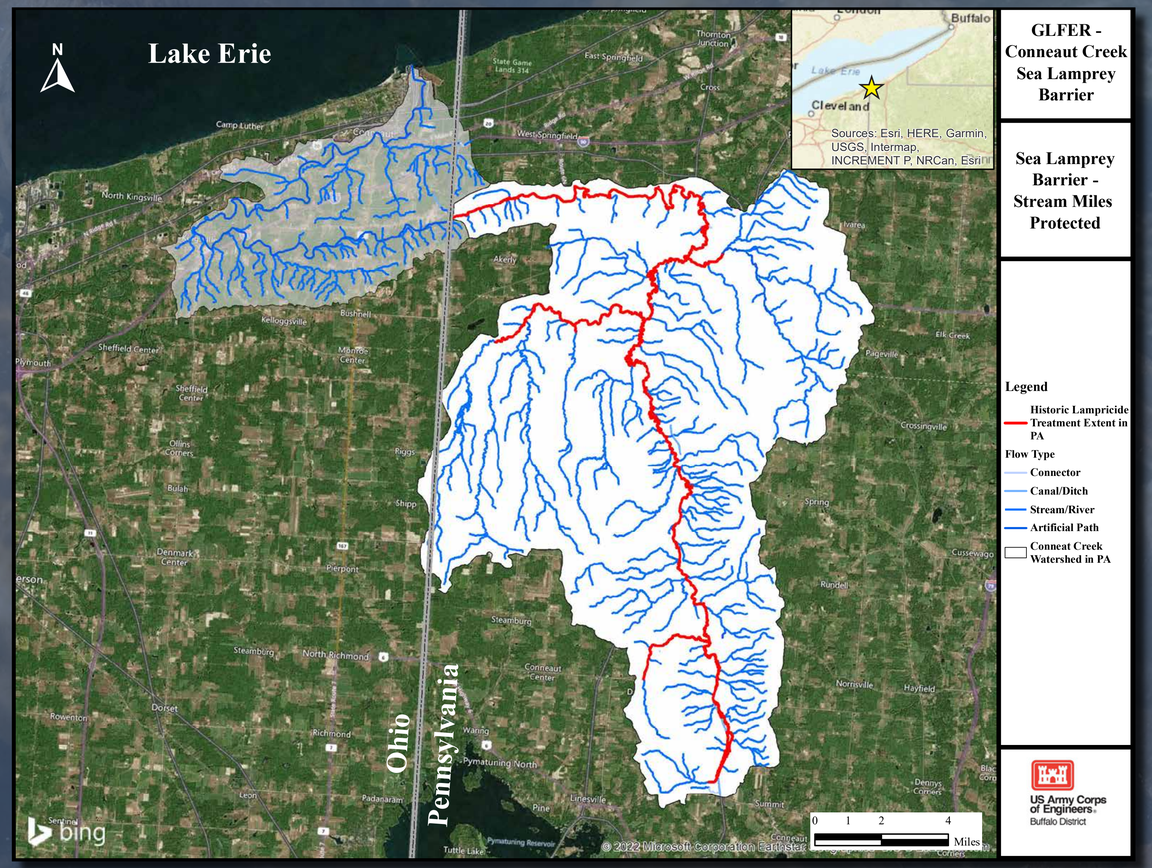
Section 506 Great Lakes Fishery and Ecosystem Restoration

FEASIBILTY STUDY

- The U.S. Army Corps of Engineers (USACE), Buffalo District and partners are investigating the feasibility of implementing a permanent sea lamprey control alternative in Conneaut Creek, Pennsylvania.
- The USACE planning process is a structured approach to problem solving, whereby the steps may be iterated one or more times as new information or new alternatives are developed or as planning objectives are reevaluated.
- The USACE conducts studies in a open and transparent way to obtain public information, opinions, understanding, trust and mutual cooperation, and must provide the public with opportunities to participate throughout the planning process.

OBJECTIVES

- Prevent or significantly reduce the number of sea lamprey from reaching nearly 50 river miles of Conneaut Creek where they currently reproduce and mature before returning to Lake Erie
- Reduce need to use lampricide, reducing negative impacts to native species
- Maintain or improve the stream habitat quality for desirable fish species



PROJECT SCHEDULE*	
Completed FID	June 2021
Executed FCSA	October 2021
Received Federal and Non-Federal Funds	October 2021
Detailed Project Report	October 2023
Execute PPA	February 2024
Plans & Specs	June 2024
Contract Award	October 2024
Start Construction	June 2025
Construction Completed	October 2025
Project Closeout	March 2026

* Note: Estimated dates contingent on funding & environmental window for construction

Project partners:

US Army Corps of Engineers® Buffalo District

U.S. Fish & Wildlife Service

Great Lakes Fishery Commission

Pennsylvania Fish and Boat Commission

pennsylvania Department of Environmental Protection

Ohio Department of Natural Resources Division of Wildlife

Sea Grant Pennsylvania

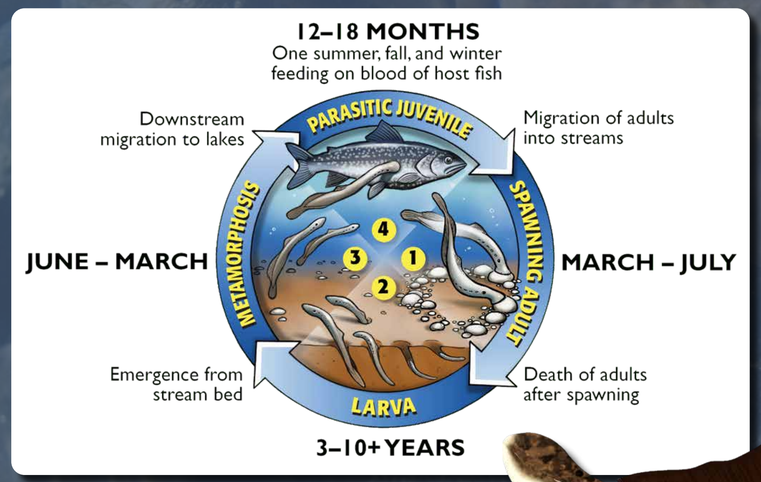
Maintaining Effective Sea Lamprey Control in Conneaut Creek

Section 506 Great Lakes Fishery and Ecosystem Restoration

Lake Erie supports robust recreational, commercial, and tribal fisheries. The annual value of the fishery to the bordering states and province (PA, OH, MI, NY and Ontario, Canada) is estimated to be nearly $3 billion. Invasive sea lampreys, which prey directly on most desirable species of fish, are the greatest threat to the health and sustainability of the fishery. Sea lamprey control has been successfully conducted in the Great Lakes basin since the mid–1950s and has reduced sea lamprey populations by 90% in most areas. Maintaining an effective control program is essential to sustain and improve the fishery and protect the economic benefits it generates.

Sea Lamprey Life History

- Between March and July (depending on water temperatures) adults will return to rivers to spawn and eventually die.
- Larvae burrow into the stream bed and filter feed for anywhere from 3 to 10 or more years.
- Once sea lampreys emerge from the stream bed, they have transformed into a parasitic juvenile. They migrate to the Great Lakes to begin feeding on fish.
- Once in the Great Lakes, sea lampreys spend between 12 and 18 months feeding on fish before they migrate back into streams and begin the cycle again.



Sea Lamprey Damage

- Each sea lamprey can kill up to 40 lbs of fish.
- Before control, sea lampreys were responsible for killing over 100 million pounds of Great Lakes fish each year.
- Sea lampreys attack valuable fish species in Lake Erie including lake trout, burbot, walleye, yellow perch, smallmouth bass, whitefish, salmon, steelhead, and sturgeon.
- Due to the pandemic, lampricide treatments could only be conducted on two Lake Erie tributaries in 2020 and 2021.

Sea Lamprey Control in Conneaut Creek

- Currently, nearly 70 miles of Conneaut Creek are infested with larval sea lampreys. Left untreated, more than 6,500 parasitic sea lampreys will enter Lake Erie from this system.
- Conneaut Creek has been treated with lampricide 11 times since 1986.
- Current lampricide treatments cost $188,000 and are required every 3-5 years.
- A new barrier would remove 43-47 miles of stream from future lampricide treatments.
- Bessemer Dam protects a population of Northern Brook Lamprey, an endangered species in Pennsylvania.

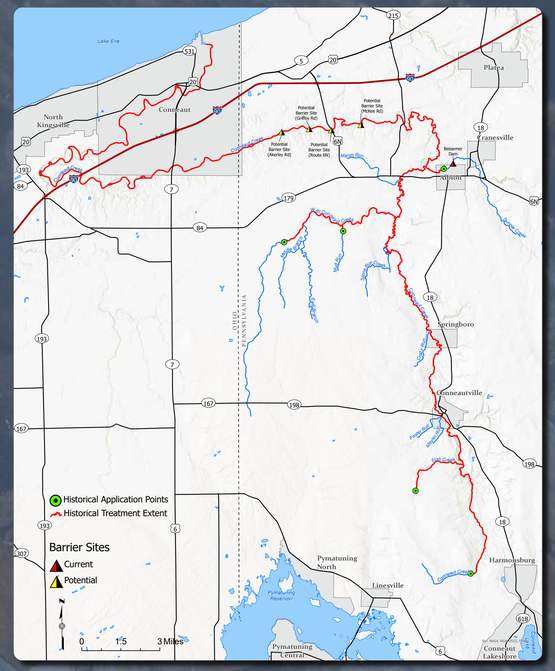


Figure 1. Sea lamprey infestation in Conneaut Creek; red line indicates historical treatment area, green dots identify historical treatment locations.

Project partners:

US Army Corps of Engineers® Buffalo District

U.S. Fish & Wildlife Service

Great Lakes Fishery Commission

Pennsylvania Fish and Boat Commission

pennsylvania Fish and Boat Commission

pennsylvania Department of Environmental Protection

Ohio Department of Natural Resources Division of Wildlife

Sea Grant Pennsylvania

Conneaut Creek Ecology and Management

Section 506 Great Lakes Fishery and Ecosystem Restoration

PROJECT DETAILS

Purpose

- To develop a Sea Lamprey control strategy that reduces or eliminates the need to chemically treat Conneaut Creek with lampricide in Pennsylvania.

Motivation

- Lampricide treatment is an effective way to eliminate larval Sea Lamprey, but it can also have negative impacts on nontarget aquatic fauna.
- Collectively, the agencies that are partnering on this project are trying to prevent the proliferation of Sea Lamprey in the Great Lakes while protecting the diverse assemblage of aquatic organisms that call Conneaut Creek home.

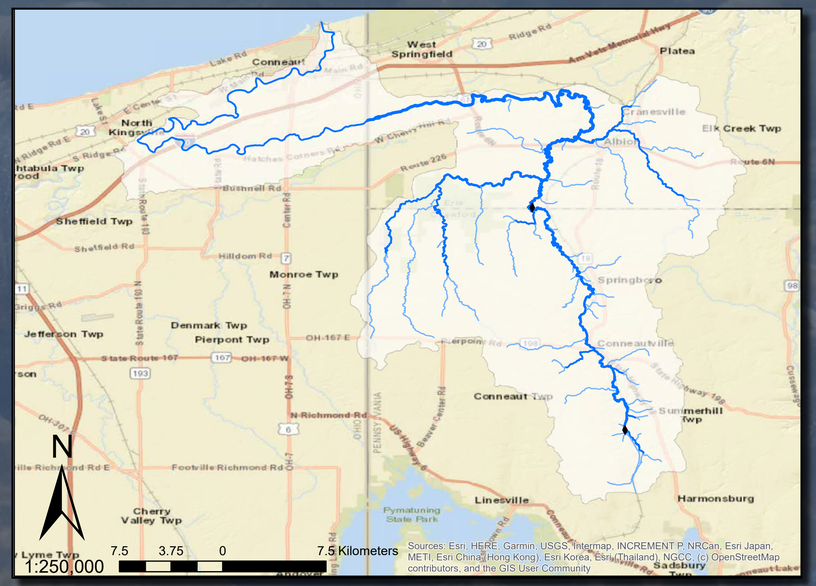
Other Considerations

- We are seeking to optimize the costs and benefits associated with alternative Sea Lamprey control strategies affecting:
  - Sportfish populations
  - Rare, threatened, and endangered Species
  - Impact of a physical barrier in a flowing system
  - Public safety
  - Recreational opportunities

Freshwater mussels from Conneaut Creek, PA, credit – Joe Brancato

Eastern Sand Darter, credit – Rob Criswell

CONNEAUT CREEK



- The Conneaut Creek watershed drains approximately 153 square miles in northwest Pennsylvania and empties into Lake Erie near Conneaut, Ohio.
- Supports a diverse aquatic community including at least 63 species of fish.
- Supports diverse recreation ranging from angling for coldwater species like stocked trout and Steelhead, to angling for warmwater species like Muskellunge and Smallmouth Bass, to paddling the creek in canoes and kayaks.
- Due to the changing habitat and communities from the headwaters to the mouth of Conneaut Creek, it is separated into three fisheries management sections in Pennsylvania.

SPECIES OF CONNEAUT CREEK

- Fish community includes at least six state threatened and endangered species - Northern Brook Lamprey, Redfin Shiner, Hornyhead Chub, Eastern Sand Darter, Spotted Sucker, and Brindled Madtom
- Conneaut Creek also supports numerous mussel species such as the Salamander Mussel, documented in Ohio near the Pennsylvania border
- Mudpuppy, an amphibian of conservation concern, is also found in Conneaut Creek and serves as a host species for the Salamander Mussel

Mudpuppy, credit – Nevin Welte

Native Northern Brook Lamprey, credit – Rob Criswell

Hornyhead Chub, credit – Rob Criswell

Project partners:

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U.S. Fish & Wildlife Service

Great Lakes Fishery Commission

Pennsylvania Fish and Boat Commission

pennsylvania Department of Environmental Protection

Ohio Department of Natural Resources Division of Wildlife

Sea Grant Pennsylvania

Conneaut Creek Sea Lamprey Barrier

Section 506 Great Lakes Fishery and Ecosystem Restoration

SURVEYS NEEDED TO COMPLETE THE FEASIBILITY STUDY

- Survey creek elevations at regular intervals thoughout the study area (no ground disturbance)
- Instream and floodplain habitat and biologic assessments (no ground disturbance)
- Cultural resource surveys and geotechnical investigations once a site or few sites are selected for the barrier (minimal ground disturbance)

RIGHTS OF ENTRY

RIGHTS OF ENTRY are for SURVEY purposes ONLY.

- Signing a Right of Entry for survey purposes DOES NOT grant the United States Federal Government or ANY State or Local Agency the right to use the property identified in the Right of Entry for construction related to this project.
- The surveys to be conducted are NON-INVASIVE in nature. The purpose of the surveys is data collection pertaining to the physical characteristics and natural resources of Conneaut Creek. All survey equipment is handheld and can be carried onto and out of the property by foot.

The Rights of Entry grant the Government the right:

- To enter onto the identified property for the time period described on the right of entry,
- To retain the ownership of data collection tools used for the survey, and
- To financially compensate for any damage done to the property during the act of surveying.

Project partners:

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Conneaut Creek Sea Lamprey Barrier

Section 506 Great Lakes Fishery and Ecosystem Restoration

SEA LAMPREY BARRIERS

Fixed-Crest Barriers use an uninterrupted fixed-crest height and overhanging lip to maintain a vertical drop from the barrier crest to the tailwater elevation.

- Oldest and most common (39 total) barrier type in the Great Lakes basin
- Block upstream movement of adult sea lamprey as well as many non-target species
- Jumping pools and fishways are needed to maintain fish passage for desired species

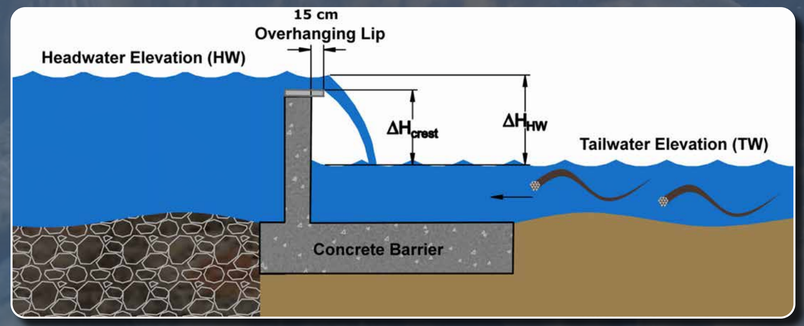

Diagram of typical fixed-crest sea lamprey barrier illustrating the difference between hydraulic head and vertical differential between barrier crest and tailwater elevation (*Source: Zielinski et al, 2019*)

Fixed-crest barriers at (A) Trail Creek, Indiana and (B) Carp Lake Outlet, Michigan

Seasonal and Adjustable-Crest Barriers are similar to fixed-crest barriers, but the crest can be adjusted manually or automatically.

- Can be raised seasonally to block sea lamprey adults during spawning period then lowered to pass flow, debris, sediment, and non-jumping resident fish

Big Carp River inflatable-crest barrier, (A) not operating with inflatable barrier down, (B) in the operating position with barrier raised (*Source: Zielinski et al, 2019*)

Obermeyer adjustable barrier (*Source: Obermeyerhydro.com*)

Inflatable rubber adjustable barrier (*Source: Obermeyer.com*)

Hybrid Barriers combine two or more barrier technologies to increase effectiveness and minimize impacts to hydrology and biologic connectivity.

- Fixed-crest and electrical barrier installed on the Ocqueoc River has been very effective at blocking sea lamprey while allowing upstream passage of steelhead trout and other species

Combined fixed-crest and electric barrier on the Ocqueoc River, Michigan (*Source: Zielinski et al, 2019*)

Project partners:

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Pennsylvania Fish and Boat Commission

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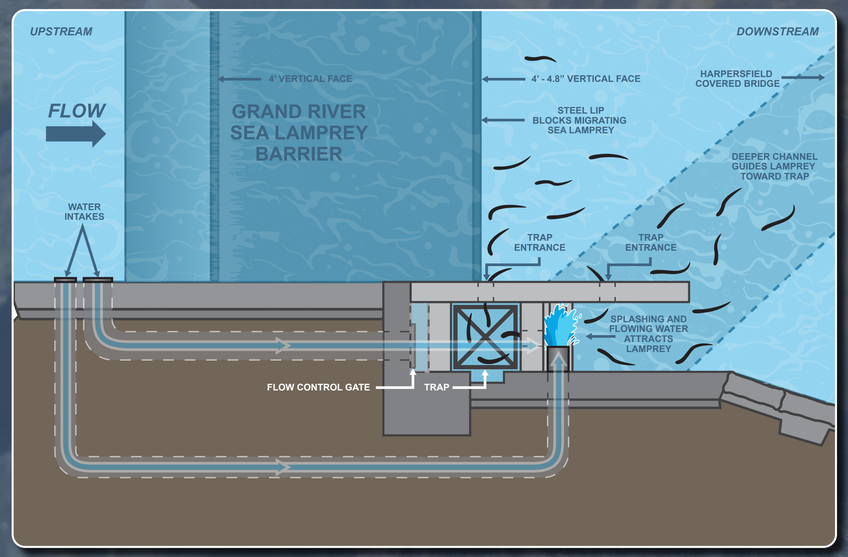
Conneaut Creek Sea Lamprey Barrier

Section 506 Great Lakes Fishery and Ecosystem Restoration

TRAPS

- Used to assess sea lamprey spawning populations each year during the spawning run (March-June) and determine effectiveness of controls.
- Allow removal of lamprey downstream of the barrier to reduce spawning populations and potentially spawning success in downstream areas of the creek.
- Native fish that are caught in traps can be sorted and passed upstream of the barrier to reduce any negative impacts of the barrier to native fish and other aquatic species populations (e.g. freshwater mussels).

Trap



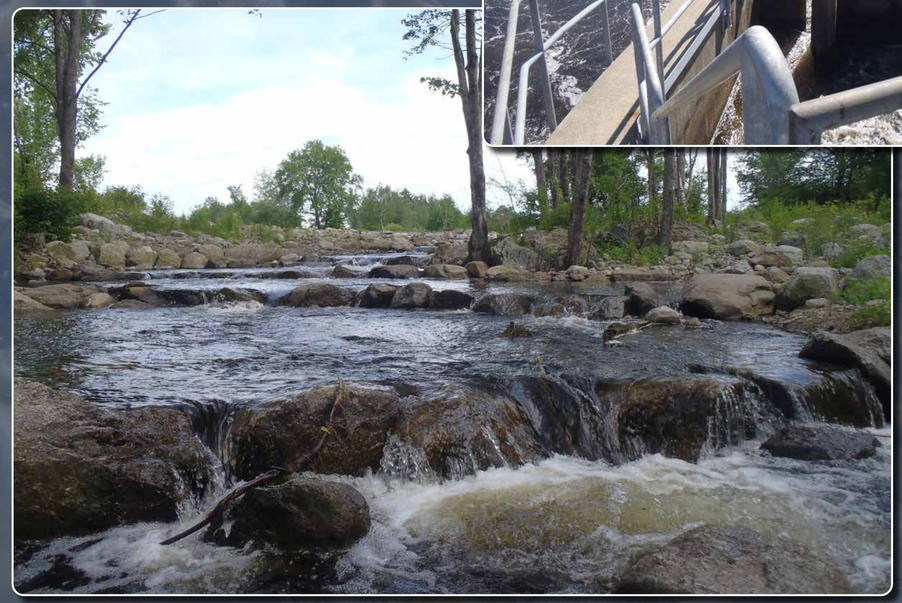
FISHWAYS

- Seasonally operated to allow fish to freely migrate upstream of the barrier after the sea lamprey spawning run.
- Fish traps can be incorporated into the fishway to ensure native fish species are sorted and passed upstream of the barrier during the sea lamprey run.

Denil

StanChem Dam Fishway on the Mattabesset River in East Berlin, CT (Source: The Connecticut River Salmon Assoc.)

Nature-Like Bypass



(Source: USFWS, Northeast Region)

Vertical Slot

(Source: USFWS, Northeast Region)

Project partners:

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U.S. Fish & Wildlife Service

Great Lakes Fishery Commission

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SCOPING INFORMATION

CONNEAUT CREEK
GREAT LAKES FISHERY AND ECOSYSTEM RESTORATION (GLFER) -
SEA LAMPREY BARRIER PROJECT

Section 506 of the Water Resources Development Act (WRDA) of 2000,
as amended by Section 5011 WRDA 2007

July 22, 2022

U.S. Army Corps of Engineers
Buffalo District
1776 Niagara Street
Buffalo, New York 14207-3199

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1.0 INTRODUCTION

The National Environmental Policy Act (NEPA) directs federal agencies to initiate "an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to the proposed action." The U.S. Army Corps of Engineers (USACE) has prepared this scoping information to elicit public and agency concerns and comments, clearly define the environmental issues and alternatives that should be examined, and identify any federal, state and local requirements that may need to be addressed in this project regarding the construction of a sea lamprey barrier on the mainstem of Conneaut Creek upstream of the Pennsylvania – Ohio border (RM 39.1) and downstream of the confluence of the East Branch of Conneaut Creek (RM 54.6). This area is located in Erie and Crawford Counties, Pennsylvania. (Figure 1).

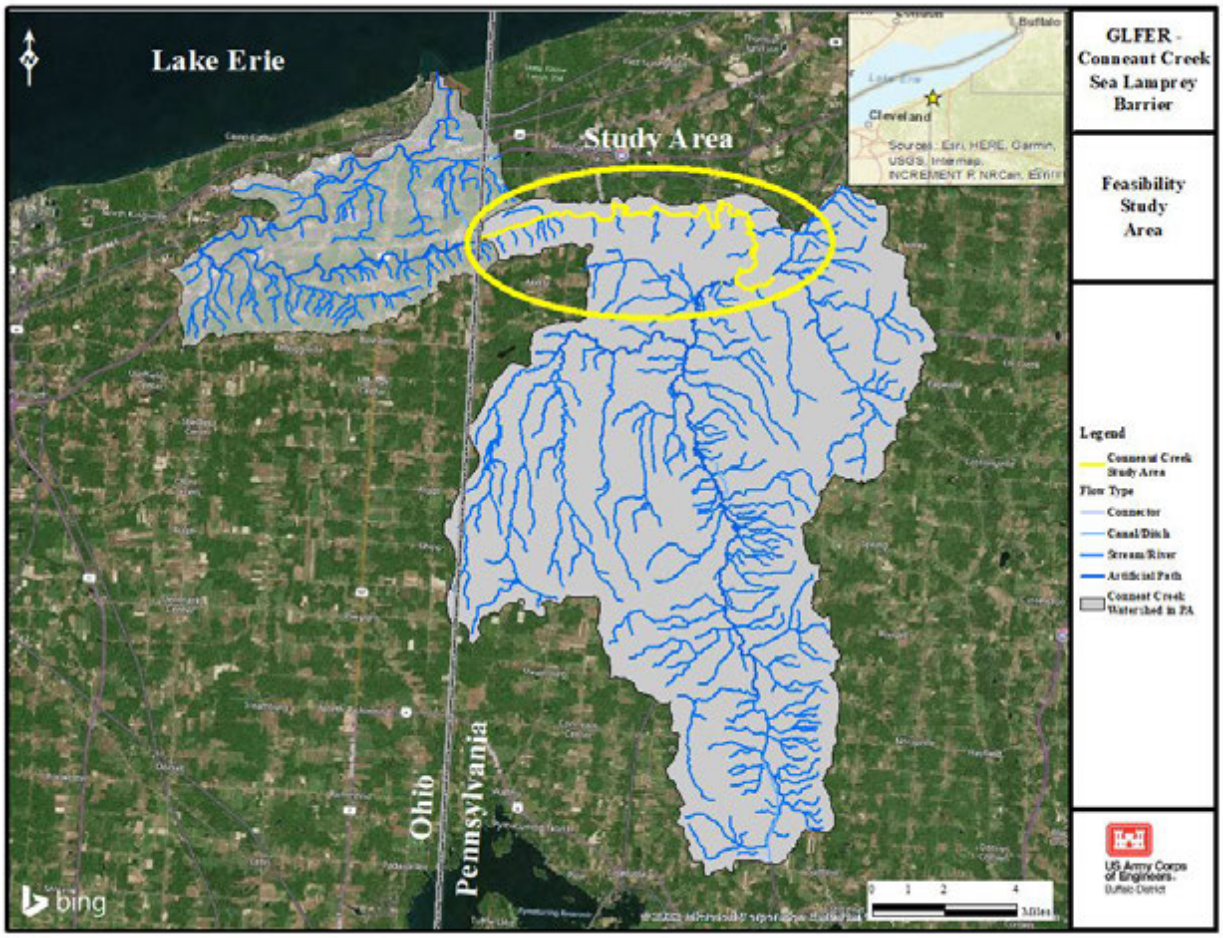

Figure 1. Conneaut Creek Watershed Map with Study Area Highlighted.

2.0 PURPOSE AND NEED FOR THE PROJECT

2.1 Problem and Need for Action

The sea lamprey (*Petromyzon marinus*) is a primitive, eel-like fish that entered the Great Lakes from the Atlantic Ocean (Figure 2). Mature adults migrate into streams to spawn from early March through July in various parts of the Great Lakes basin, as indicated in the sea lamprey life cycle (Figure 3). Adults die after spawning and the larvae (ammocoetes) that develop from the eggs take up residence in stream bottoms feeding on organic debris and algae present in the stream until they transform to their parasitic form and return to the lakes 3 to 10 years later. Upon returning to the lakes, they attach to large fish such as salmon and lake trout using their suction-cup like mouths to feed on them as parasites. During their parasitic phase, which lasts 12 to 18 months, it is estimated that each lamprey kills approximately 40 pounds of fish. The mortality caused by the sea lamprey, combined with intense fishing pressure and fish spawning habitat destruction, has resulted in the decline of many native fish species in the Great Lakes.

Figure 2: Sea lamprey in a tank. Photo by Joanna Gilkeson / USFWS (Source: https://www.fws.gov/midwest/SeaLamprey/

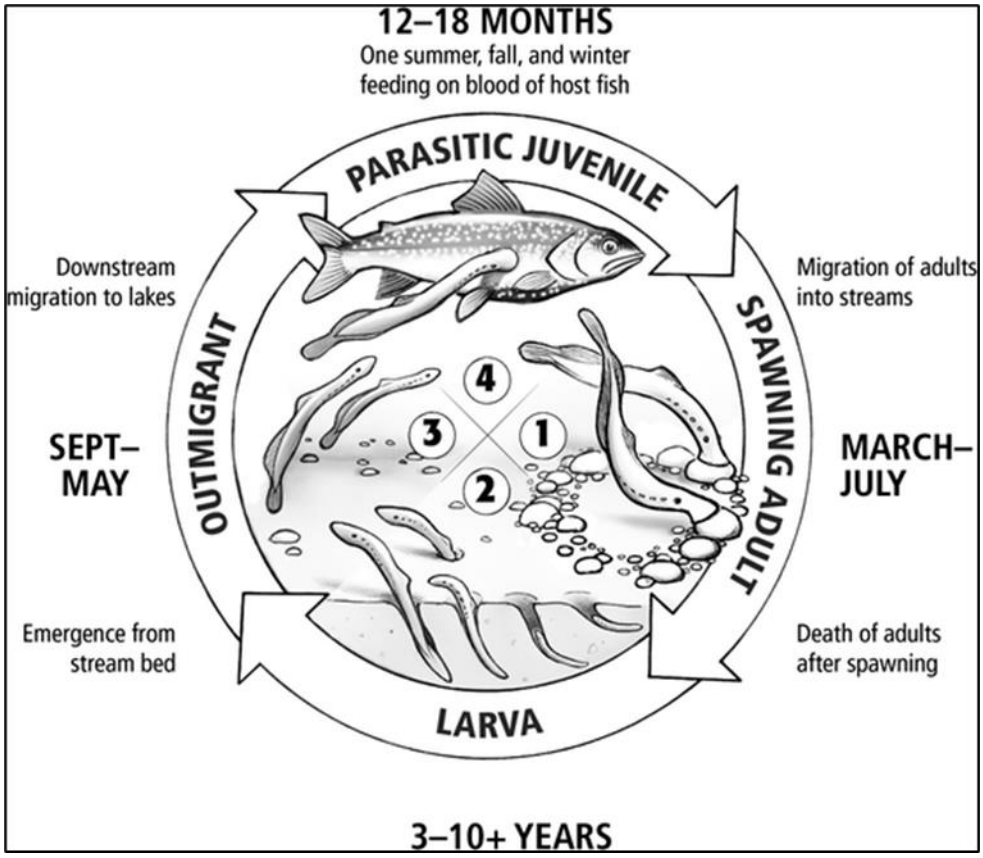

Figure 3: Sea lamprey life cycle (Hansen et al. 2016)

As a result of the dramatic declines in fish stocks, the 1954 bi-national Convention on Great Lakes Fisheries formed the Great Lakes Fishery Commission (GLFC). The Convention charged the GLFC with formulating and implementing a comprehensive sea lamprey control program. A major advance in sea lamprey control occurred with the development and use of lampricides in the late 1950s. Lamprey populations have declined an estimated 90 percent since 1961, largely through the use of lampricides. However, sea lamprey still remain a problem. In addition, there is concern about the continued heavy dependence on chemical treatment. Although extensive tests on the environmental safety of lampricides (3-trifluoromethyl-4-nitrophenol TFM and Bayluscide) have revealed no long-term detrimental effects to the ecosystem, some native species can be adversely affected and there is public apprehension about all pesticides. Additionally, early studies that suggest sea lamprey have the potential to evolve resistance to lampricide further underscores the need for alternative controls (Christie et al., 2019). Lastly, lampricide costs have rapidly escalated and the use of integrated methods (i.e., control methods other than pesticide) for pest management is widely accepted as being the preferred approach.

The strategic vision of the GLFC contains three "pillars" for success under its vision statement. Pillar 2 targets "Integrated Sea Lamprey Control," which states that "the Commission will suppress sea lamprey populations to levels that permit achievement of fish community objectives for each Great Lake." Each pillar contains a set of goals and strategies. Goal 1 under Pillar 2 is "Suppress sea lamprey populations to target levels." Development of a Sea Lamprey Barrier and Trap on Conneaut Creek supports Strategies 5 and 6 under Pillar 2.

Strategy 5: Construct and maintain a network of barriers to limit sea lamprey access to spawning habitats. Outcome: Sea lampreys will have reduced access to spawning habitats.

Strategy 6: Deploy trapping methods to increase capture of spawning-phase and recently metamorphosed sea lampreys. Outcome: Effective and efficient trapping techniques will be developed and implemented.

Thirty Lake Erie tributaries have records of larval sea lamprey production (11 Canada, 19 U.S.). The U.S. Fish and Wildlife Service (USFWS), acting as the U.S. sea lamprey control agent for the GLFC, has identified streams in the U.S. where the construction of permanent barriers and trap systems are expected to be a successful control measure and cost effective and may have less impact than application of lampricides. In this case, the project partners feel the impacts of a barrier would be less than those related to continued TFM applications. Conneaut Creek is one of seven tributaries to Lake Erie that are treated with lampricides every 2-5 years to eliminate or reduce larval sea lamprey populations before they recruit to the lake as feeding juveniles. Lampricides may negatively impact other non-target native fish and invertebrate species. The use of other control technologies, including barriers, are being investigated to control sea lamprey populations more effectively with less overall costs and environmental impact than lampricide. The GLFC has a strong commitment to reduce TFM through the implementation of alternative lamprey control strategies, including the use of barriers to block sea lamprey migration to spawning areas.

2.2 Proposed Project

The study is evaluating the feasibility of implementing a permanent sea lamprey control alternative other than the use of lampricide in Conneaut Creek, Pennsylvania to reduce the numbers of sea lamprey able to reach up to 50 miles of suitable spawning habitat upstream of the study location. This is needed to suppress sea lamprey populations to below target levels as defined in the Lake Erie fish community objectives for the Great Lakes basin while also minimizing non-target effects of the current lampricide treatments (Francis et al., 2020).

2.3 Study Authority

Section 506 of the Water Resources Development Act (WRDA) of 2000, as amended by Section 5011 WRDA 2007, authorizes the USACE to develop a plan for activities that support the management of Great Lakes fisheries in cooperation with the signatories to the Joint Strategic Plan for Management of the Great Lakes Fisheries and other affected interests. This plan is referred to as the "Support Plan" and it provides guidance for the planning, design, construction, and evaluation of projects to restore the fishery, ecosystem, and beneficial uses of the Great Lakes in cooperation with other federal, state, and local agencies and the Great Lakes Fishery Commission. Costs for the planning, design, construction, and evaluation of restoration projects are cost-shared 65 percent federal and 35 percent non-federal. Non-federal interests may contribute up to 100 percent of their share for projects in the form of lands, easements, right of ways, relocations and soil borrow and disposal areas, plus other materials, supplies, or work in-kind contributions. Non-federal interests will receive credit for lands, easements, rights–of – way, relocations, and any dredged material disposal areas needed for project construction and

must be responsible for the operation, maintenance, repair, rehabilitation, and replacement of projects. Non-federal interests may include private and non-profit entities.

3.0 ALTERNATIVE PLANS

The USACE will be conducting this study to evaluate the anticipated benefits, costs and other impacts for sea lamprey control measures that are under consideration. It is also USACE planning policy to consider any and all practicable and relevant alternative measures, including the no action alternative. The following study constraints have been identified:

- Passage of native and recreationally important species is very important. Passage of native species should be considered to limit impacts to native fish and mussel populations in Conneaut Creek. Steelhead passage is important and may be the simplest to accommodate since sea lamprey passage and steelhead passage seasons generally do not overlap.

- Any structure placed in the stream must account for public safety. Regardless of structure type, recreational use of Conneaut Creek must be kept in mind (e.g., angling, canoe/kayak). If a low head dam and/or electrical components are considered, it should be a design that prevents dangerous hydraulic conditions and safety hazards to the public.

- Depending upon the crest height of the barrier, the resulting upstream area of inundation and properties affected could constrain the type and size of an acceptable sea lamprey barrier.

- The GLFER authority limits federal project expenditure for any project conducted under this authority to $10,000,000.

- Any selected alternative must meet applicable environmental compliance requirements, including minimization or avoidance of any adverse impacts to natural resources with the project's area of influence (e.g., wetlands).

3.1 Alternatives Considered

Fixed-crest barriers are the most common types of sea lamprey barrier in the Great Lakes basin and have been proven to be very effective at blocking sea lamprey movement (Zielinski et al., 2019). Fixed-crest barriers typically have a lip on top to prevent lamprey from using their suction mouth to pull themselves over the barrier. The barrier needs to provide at least 18 inches of elevation difference to prohibit lamprey from getting over the barrier.

The GLFC "gold standard" for sea lamprey barriers is a structure with a crest elevation that provides an 18-inch drop to the tail water elevation at the 10-year ACE flow (Zielinski et al., 2019). While this standard is very effective at blocking sea lamprey, it is sometimes infeasible due to changes in watershed hydrology, potential formation of an impoundment upstream, and acceptance from the community. Lower fixed barriers can be effective at blocking sea lamprey

when combined with other barrier types. One such example is the combined low fixed crest and electric sea lamprey barrier on the Ocqueoc River, Michigan (Figure 4). Installed in 1999, the electrical barrier is only energized when the 18 inch vertical drop is compromised due to high water. This design has shown to provide a complete barrier to sea lamprey passage with minimal to no apparent damage to sea lamprey or non-target fishes.

Figure 4: Low fixed crest and electrical sea lamprey barrier built in 1998 on the Ocqueoc River, MI (Zielinski et al., 2019)

Many fixed crest barriers have lamprey traps associated with the barriers that are designed to catch lamprey as they move upstream to spawn. The lamprey traps can be either permanent or portable and are operated seasonally by the USFWS in conjunction with other natural resource agencies. Traps have attractant water released at the trap to increase trapping efficiency. Rock and toe stone at the barrier may be rearranged downstream of the barrier and trap entrance to increase trap efficiency and divert migrating sea lamprey into the trap. During operation, the traps are serviced regularly with lamprey removed for research and data collection and monitoring trends. Native fish and invertebrates captured in the traps are returned to the stream or moved upstream if requested by the resource management agency to minimize impacts to upstream and downstream biological connectivity. Stream specific adult sea lamprey population estimates are generated from catch data to develop monitoring trends. Additionally, sea lampreys are provided to agencies to be used in research.

Additional barrier types exist that can minimize or avoid changes in watershed hydrology, biologic connectivity and permanent upstream inundation (Zielinski et al., 2019). Seasonal and adjustable-crest barriers are similar to fixed crest barriers, except the crest height of can be adjusted manually or automatically. This barrier type has the advantage that it can be seasonally operated to block sea lamprey movement when adults are moving into the tributaries to spawn. The remainder of the year, the barrier can be removed or crest lowered to pass flow, debris, sediment, boats and resident fish and macroinvertebrates. Additional barrier types have or are being evaluated, include seasonal and adjustable crest, weirs and screens, velocity, electrical varieties, and other non-physical barriers. During discussions with the GLFC, USFWS, Pennsylvania Fish and Boat Commission (PFBC), and Pennsylvania Department of Environmenal Protection (PADEP) in the early phase of the feasibility study, several of these barrier types including, weirs and screens, velocity, and non physical barriers, were screened out due to not meeting objectives or violating project constraints. This has resulted in a focused array of alternatives that is going to be evaluated further during the remainder ofthe feasibility study (Table 1).

Table 1. Focused Array of Alternatives

Alternatives	Barrier Measures		Passage Measures			Recreational Measures
	Primary Barrier	**Secondary Barrier**	**Primary Passage**	**Secondary Passage**	**Tertiary Passage**	
No Action						
1	Fixed - High Crest (10 ACE + 18")		Trap & Sort	**Denil** at 5-10%, slotted priced out, natural bypass not feasible due to the length needed		Portage
4	Electrical		Trap & Sort	No additional passage needed		Portage
5a	Fixed – Low Crest	Electric	Trap & Sort	**Slotted** for initial investigation, 5% or less grade, if too expensive consider denil	Jumping Pool	Portage
5b	Fixed – Low Crest	Electric	Trap & Sort	**Natural bypass channel**, possible space and price constraint	Jumping Pool	Portage
7a	Adjustable – Low Crest (Obermeyer)t	Electric	Trap & Sort	No additional passage needed, barrier down during non-lamprey season,	Jumping Pool	Portage
7b	Adjustable – Low Crest (Inflatable Rubber Dam)	Electric	Trap & Sort	No additional passage needed, barrier down during non-lamprey season,	Jumping Pool	Portage

No Action Alternative: The USACE is required to consider the "No Action" alternative in order to comply with the requirements of the NEPA. The No Action alternative assumes that no federal action will be taken to construct a sea lamprey control barrier on Conneaut Creek. The proposed study area would be expected to remain the same in terms of river hydraulics, geomorphology, non-native species, TFM treatments and habitat impacts. Without the installation of a sea lamprey barrier and trap on this stream, TFM treatments will not be reduced resulting in a continuing negative impact to some of the native species in Conneaut Creek. Additionally, the majority of the East Branch Conneaut Creek does not need to be treated because the Bessemer Dam currently acts as a sea lamprey barrier and also protects a native population of northern brook lamprey (*Ichthyomyzon fossor*), a state listed species. However, given the deteriorated state of that dam, it is anticipated that the dam will eventually fail and the upstream segment may need to be treated for sea lamprey in the near future, adversely affecting the native northern brook lamprey population

Alternative 1: A high fixed crest sea lamprey barrier alternative was developed because it represents the GLFC "gold standard" for sea lamprey barriers with a crest elevation that provides an 18-inch drop to the tail water elevation at the 10-year ACE (Figure 5). Due to the relatively high crest height of Alternative 1 and the associated degree of the upstream inundation, additional alternatives are being evaluated that have less inundation impacts.

Alternative 4: An electrical barrier with trap and sort fish passage (Figure 6) . This barrier relies on an eletrcial array being operated seasonally during the sea lamprey run and then turned off during the non-lamprey sampling period. The electrodes would be placed in coduits on the bottom of the stream and operated to have an effected electrical field that will stun lamprey as they attempt to move upstream. There would be no inundation associated with this type of barrier. However, this type of barrier would block passage of all species upstream and only fish collected in the trap will be sorted and those native species and highly valued sportfishes will be passed upstream of the barrier. There are concerns associated with this barrier potentially impacting downstream outmigration of native species during the March – July sea lamprey run time period when the electrical barrier would be operated

Alternative 5a: A fixed low crest barrier and electrical barrier with trap and sort, slotted fishway, and jumping pool (Figure 7). This barrier is similar to the Ocqueoc River barrier previously discussed with a slotted fishway that can provide passage of fish during the non-lamprey run season and then fish collected in trap will be sorted and native fish and highly valued sportfishes will be passed upstream during the lamprey spawning run. The electrical barrier is only turned on when flows increase and less than an 18" drop to the tail water elevation. The electrical barrier turns back off once the flows decrease and the 18" drop to tailwater elevation is maintained. The slotted fishway is usually set to a lower grade and works over a wider range of flows than other engineers fish passage structures enabling a wider range of fis species and size ranges of fish to be passed over the structure.

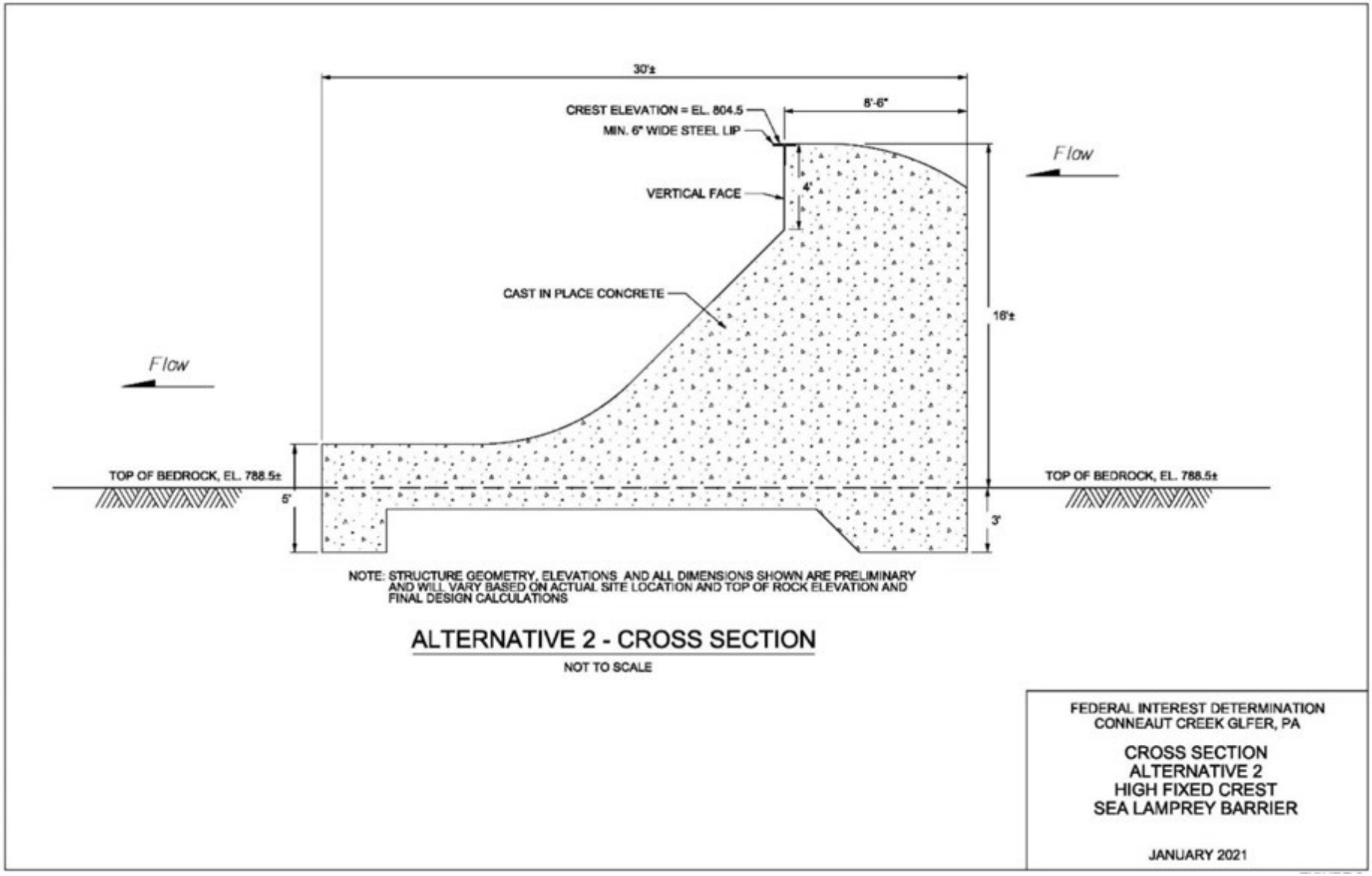

Figure 5: Cross-section of Alternative 2 – High fixed crest sea lamprey barrier

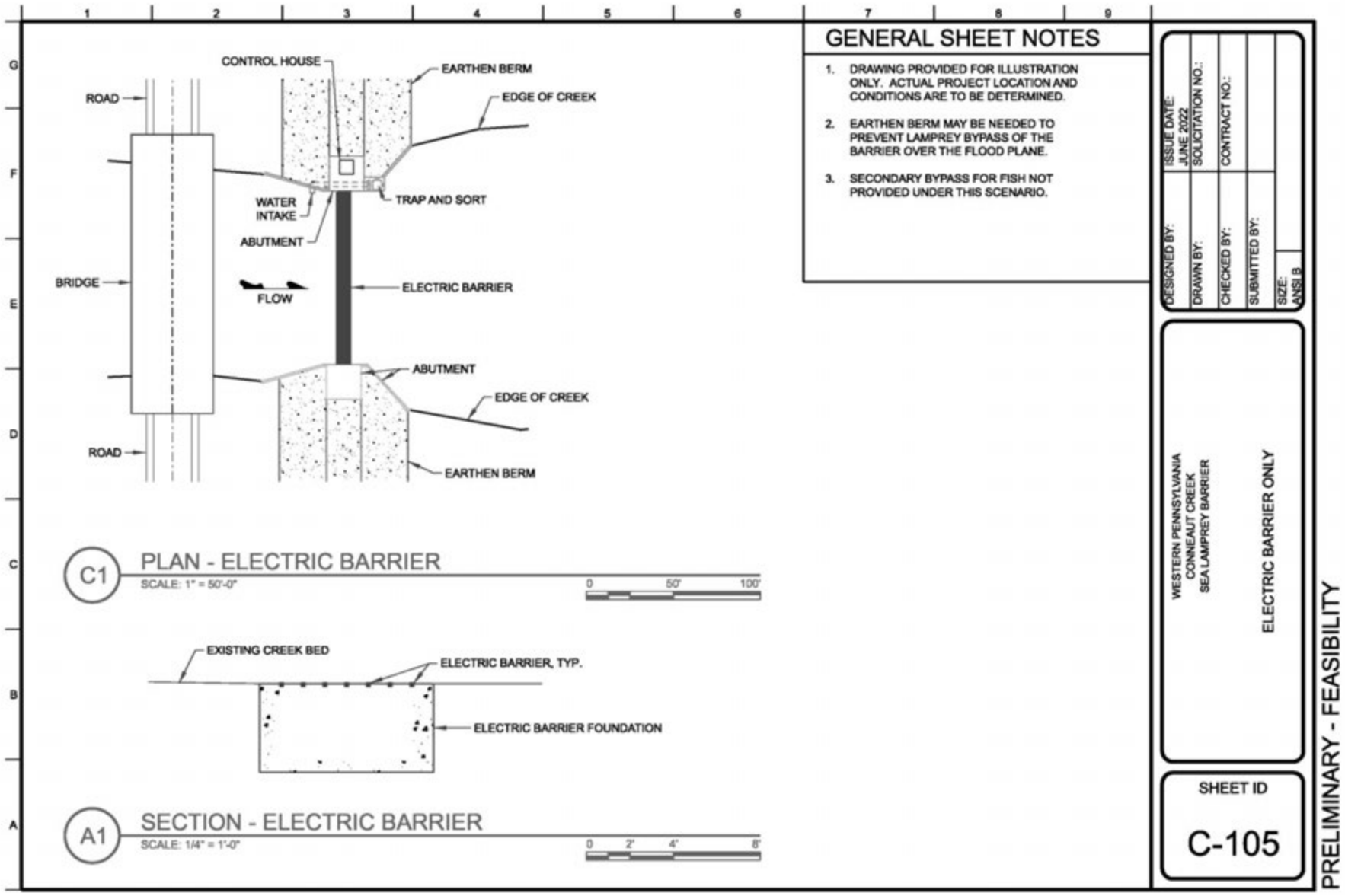

Figure 6: Plan view and cross-section of Alternative 4 – Electrical barrier with trap and sort

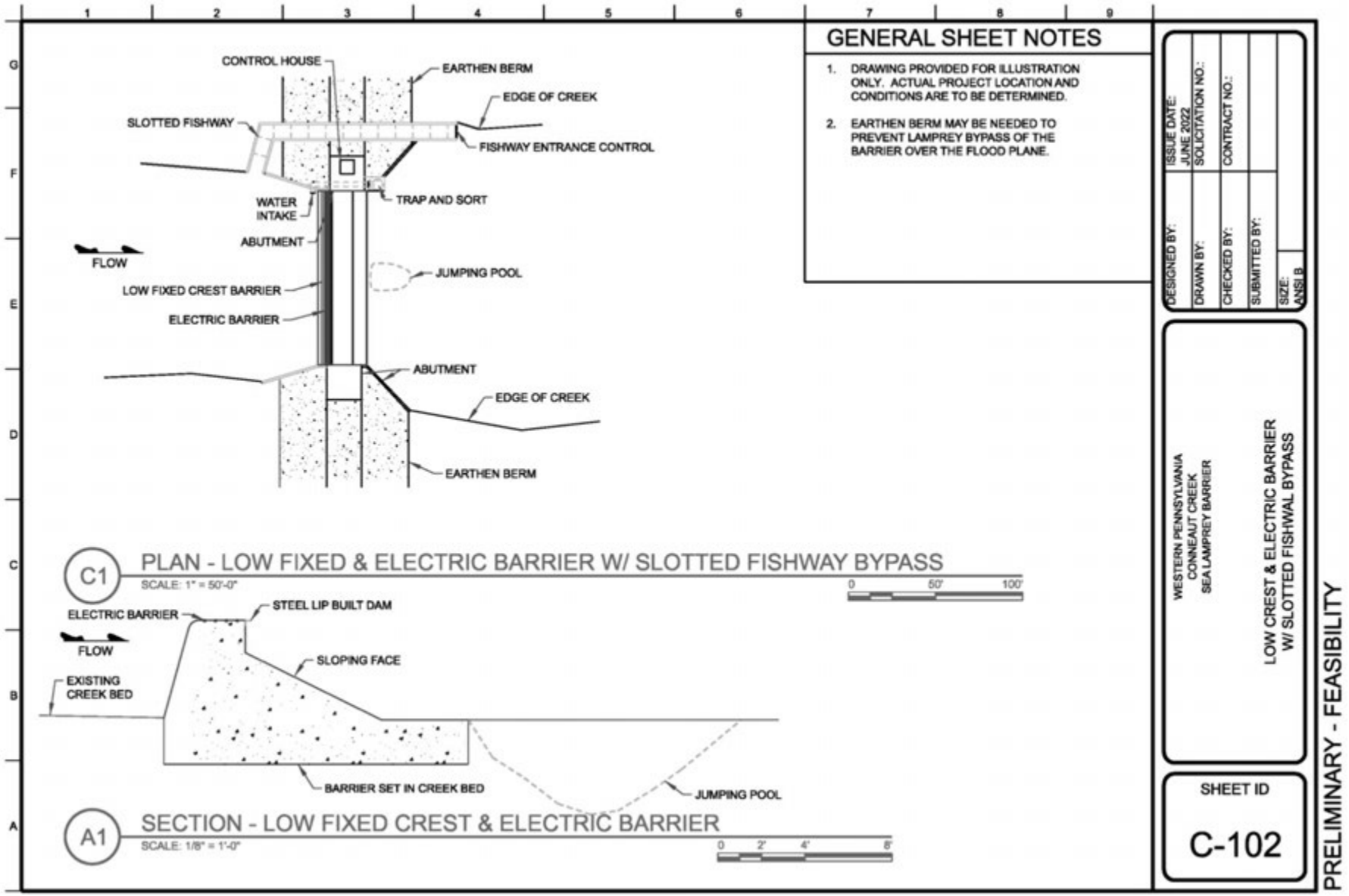

Figure 7: Plan view and cross-section of Alternative 5a – Electrical barrier with trap and sort

***Alternative 5b**:* A fixed low crest barrier and electrical barrier with trap and sort, natural bypass fishway, and jumping pool (Figure 8). This barrier is similar to Alternative 5a with the exception of a natural bypass fishway which usually has the lowest gradient and passes the widest range of species over a wide range of flows. The main difference is this requires more room due to is shallower slope.

***Alternative 7a**:* An adjustable low crest barrier that uses an Obermeyer gate and electrical barrier with trap and sort, and jumping pool (Figures 9 &10). This barrier has an adjustable height section that that uses a steel plate that is hinged to the bottom with an air bladder behind it that is inflated or deflated with air pressure from a compressor to adjust the height of the barrier. This type of barrier can be adjusted over a wide range of flows to maintain a suitable barrier while potentially reducing inundation duration when compared to other types of structures.. This type of structure requires more equipment when compared to other barriers and may require additional operations and maintenance costs.

***Alternative 7b**:* An adjustable low crest barrier that uses a rubber dam and electrical barrier with trap and sort, and jumping pool (Figures 11 & 12). This barrier is similar to Alternative 7a with the exception of a rubber bladder being the adjustable dam portion.

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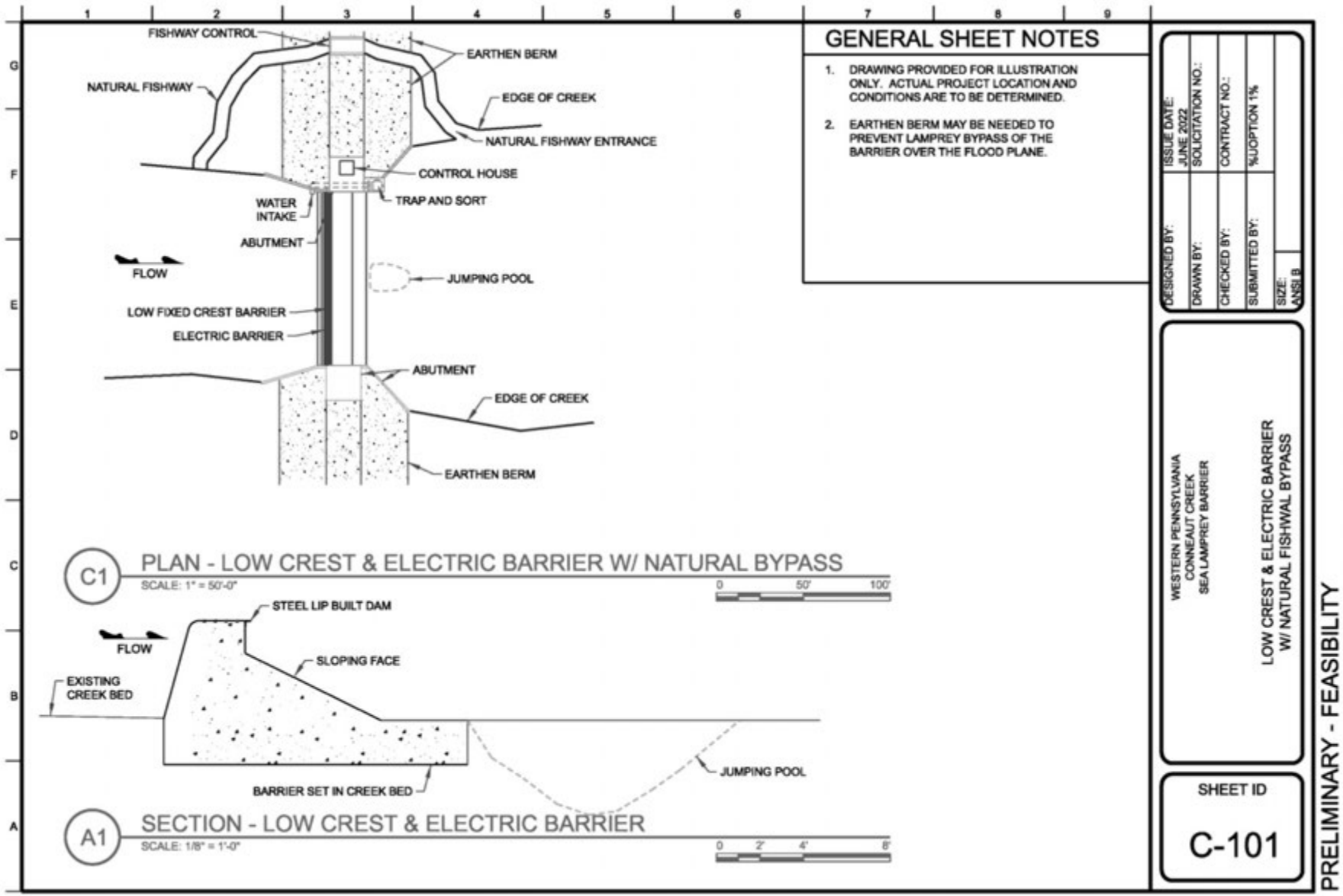

Figure 8: Plan view and cross-section of Alternative 5b – Low crest and electrical barrier with trap and sort, natural bypass fishway, and jumping pool

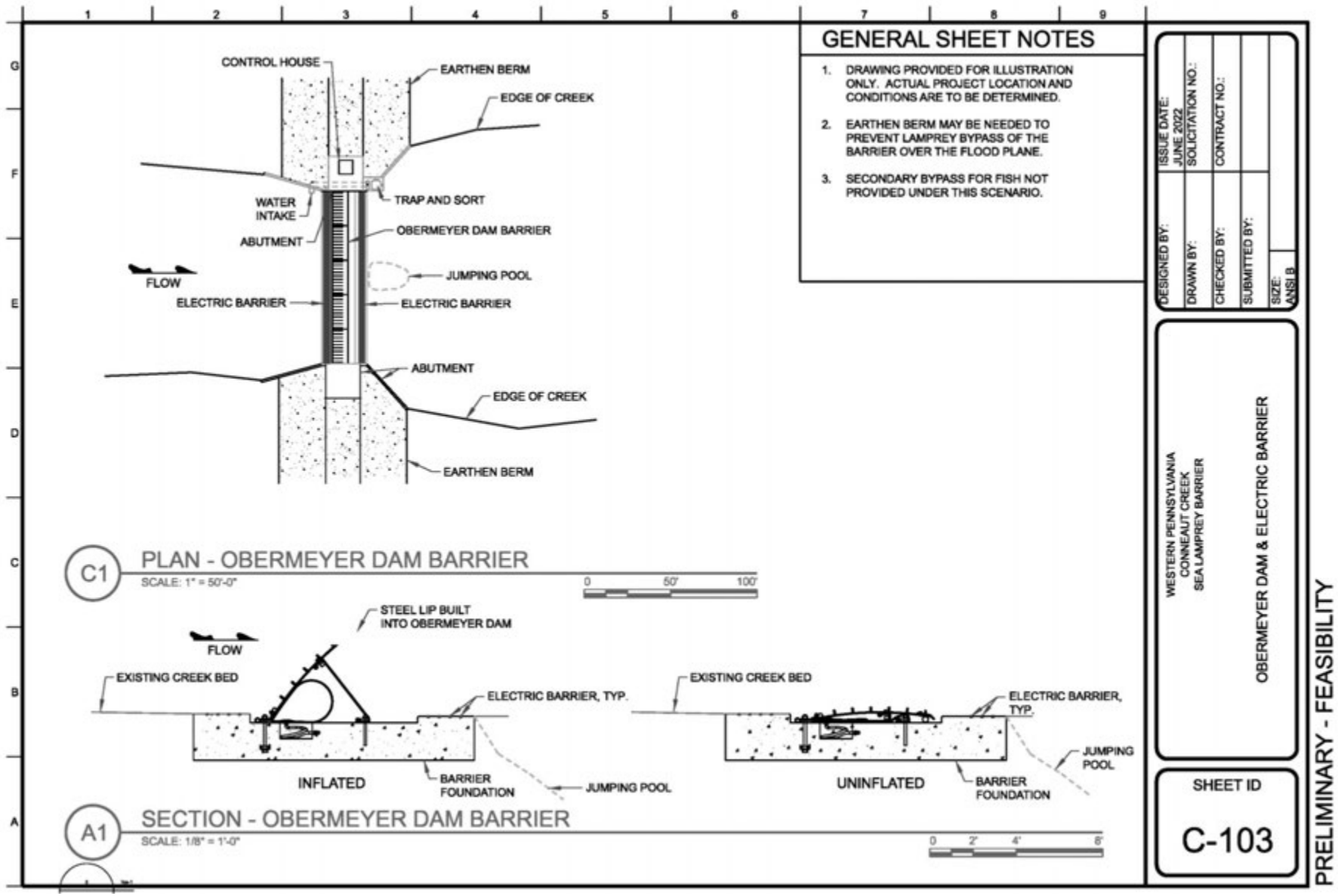

Figure 9: Plan view and cross-section of Alternative 7a – Adjustable low crest (Obermeyer) and electrical barrier with trap and sort and jumping pool

Figure 10: Example of adjustable low crest barrier (Obermeyer) A:lowered B: raised.

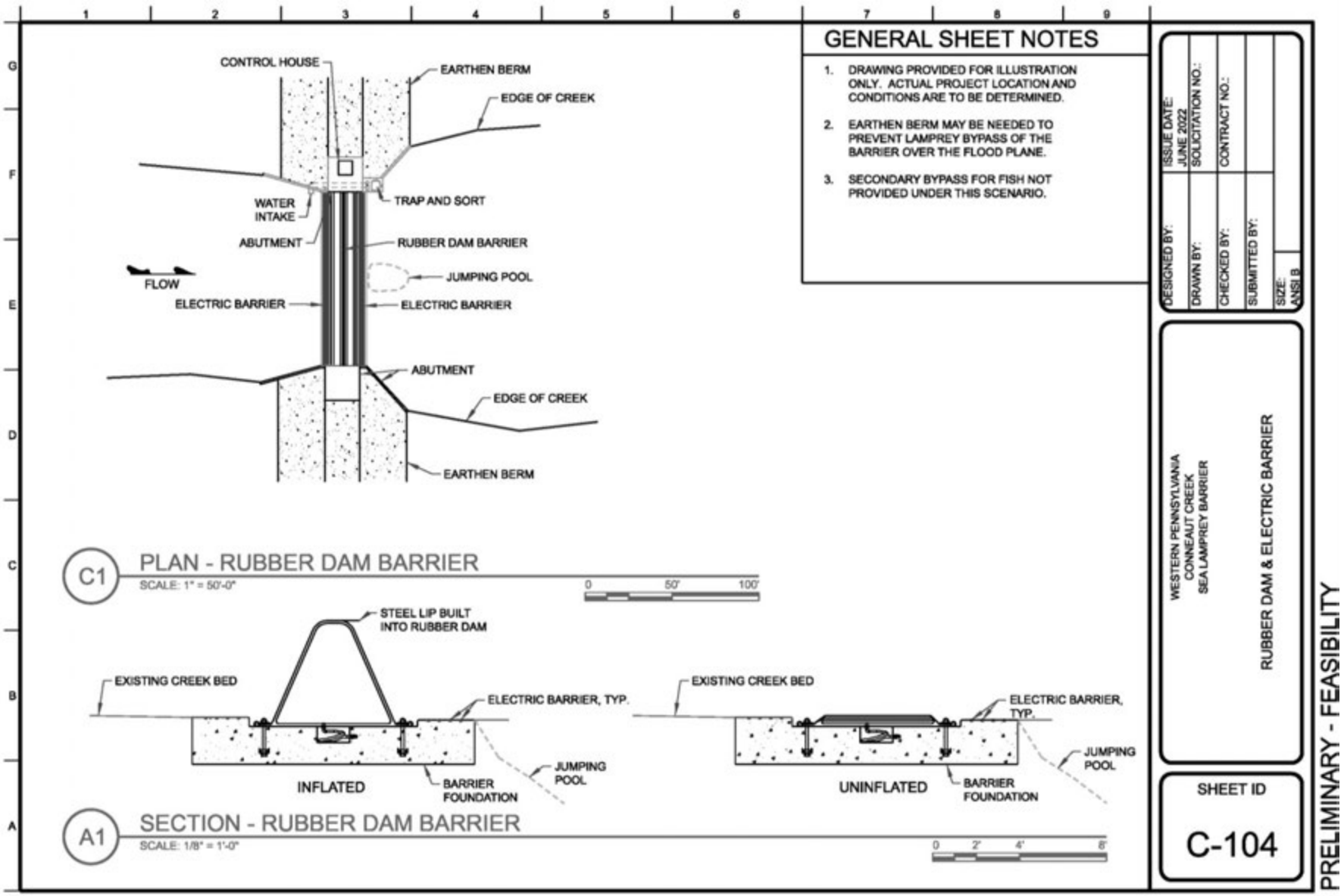

Figure 11: Plan view and cross-section of Alternative 7b – Adjustable low crest (Rubber Dam) and electrical barrier with trap and sort and jumping pool

Figure 12: Example of Inflatable Rubber Dam (Source: https://www.rubberdam.org/product/bookend-rubber-dam.html)

4.0 PUBLIC PARTICIPATION AND INTERAGENCY COORDINATION

Throughout the scoping process, stakeholders and interested parties are invited to provide comment on this study. Potential social, economic and environmental benefits and adverse impacts that may result from each alternative that is selected for detailed analysis will be addressed in future documentation. Interested parties are welcome to contact USACE to discuss their views and recommendations regarding this study. Comments will be accepted by mail/email until the close of this scoping period on August 22, 2022.

5.0 IMPACT ASSESSMENT

The project and environmental assessment (EA) will be consistent with sound engineering practices and will be drafted concurrently with actions to achieve compliance with other applicable federal environmental compliance requirements and consistent with any applicable state and local plans. Future conditions with the no action alternative and any potential impacts associated with the preferred alternative will be assessed in relation to several parameters, including but not necessarily limited to the following social, economic and environmental categories:

- Fish and Wildlife Resources
- Water Quality
- Dredged/Excavated Material Management
- Geology and Soils
- Contaminated Materials
- Air Quality
- Noise
- Recreation
- Historic Properties
- Property Values and Tax Revenues
- Employment
- Community Cohesion and Growth
- Transportation
- Public Facilities and Services
- Aesthetics
- Environmental Justice

6.0 COMPLIANCE WITH ENVIRONMENTAL PROTECTION STATUTES

Federal environmental protection statutes that will be addressed are listed below, with additional potentially applicable public laws, executive orders, and policies listed in Table 1:

- *National Environmental Policy Act (NEPA)*. In accordance with the Council on Environmental Quality's "Regulations for Implementing the Procedural Provisions of the NEPA of 1969" (40 CFR 1500-1508) and Engineer Regulation 200-2-2 (Procedures for Implementing NEPA), USACE will assess the potential environmental effects of the study alternatives on the quality of the human environment. Using a systematic and interdisciplinary approach, an assessment will be made of the potential environmental impacts (including cumulative impacts) for each plan as determined by comparing the potential future with- and without-project conditions.

- *Clean Water Act.* If the recommended plan involves the placement of dredged or fill material into waters of the United States, USACE will evaluate the discharge in

accordance with the Clean Water Act Section Section 404(b)(1) Guidelines. Water quality and related information used in this evaluation will provide documentation to demonstrate that the recommended plan is in compliance with this Act. A Section 404(a) public notice would be circulated and an opportunity to request a public meeting will be afforded to all potentially affected parties. Section 401 water quality certification for the discharge would be requested from the PADEP.

Under Section 402 of the Act, if the recommended plan disturbs greater than one acre of ground surface, then USACE or its contractor would develop a stormwater pollution prevention plan and submit it along with a notice of intent to the PADEP for coverage under their State Pollutant Discharge Elimination System general permit for construction activities.

- *Endangered Species Act*. In accordance with Section 7 of this Act, USACE is requesting information from the USFWS on any listed or proposed species, or designated or proposed critical habitat that may be present in the project area. The USFWS IPaC website indicates that there are two federally threatened species and one federally endangered species listed as being present in the Conneaut Creek Watershed in Pennsylvania (
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- Table 2). The bald eagle is also identified as occurring within the watershed, although it is no longer listed on the endangered species list. It is, however, protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668) and is further protected by Pennsylvania Game and Wildlife Code.

Table 2. Federally Listed Species and Critical Habitat(s) in Pennsylvania portion of Conneaut Creek Watershed.

Common Name	Scientific Name	Status
Indiana bat	*Myotis sodalis*	Endangered
northern long-eared bat	*Myotis septentrionalis*	Threatened
red knot	*Calidris canutus rufa*	Threatened
	Species Richness	3

The study area is found withing the Conneaut Creek Natural Heritage Area (
Figure 13) which contains at least nine freshwater mussels and four mussel species of state concern. Populations of these species are scattered in numerous locations along the length of the core habitat (
Figure 13). The floodplain of Conneaut Creek is known to contain Shumard's Oak (*Quercus shumardii*) which is state endangered. The adjacent floodplain wetlands may also contain plants such as Virginia blue flag (*Iris virginica*; state endangered), small beggar ticks (*Bidens discoidea*; state rare), and pineland pimpernel (*Samolus parviflorus*; state rare). Further coordination will be required with the USFWS, PAFBC, and Pennsylvania Natural Heritage Program to identify species within the project area to avoid and/or minimize impacts to these species. This will likely include surveys to

identify the presence of such species within the project area, including mussel surveys, habitat surveys, and possibly mist net surveys.

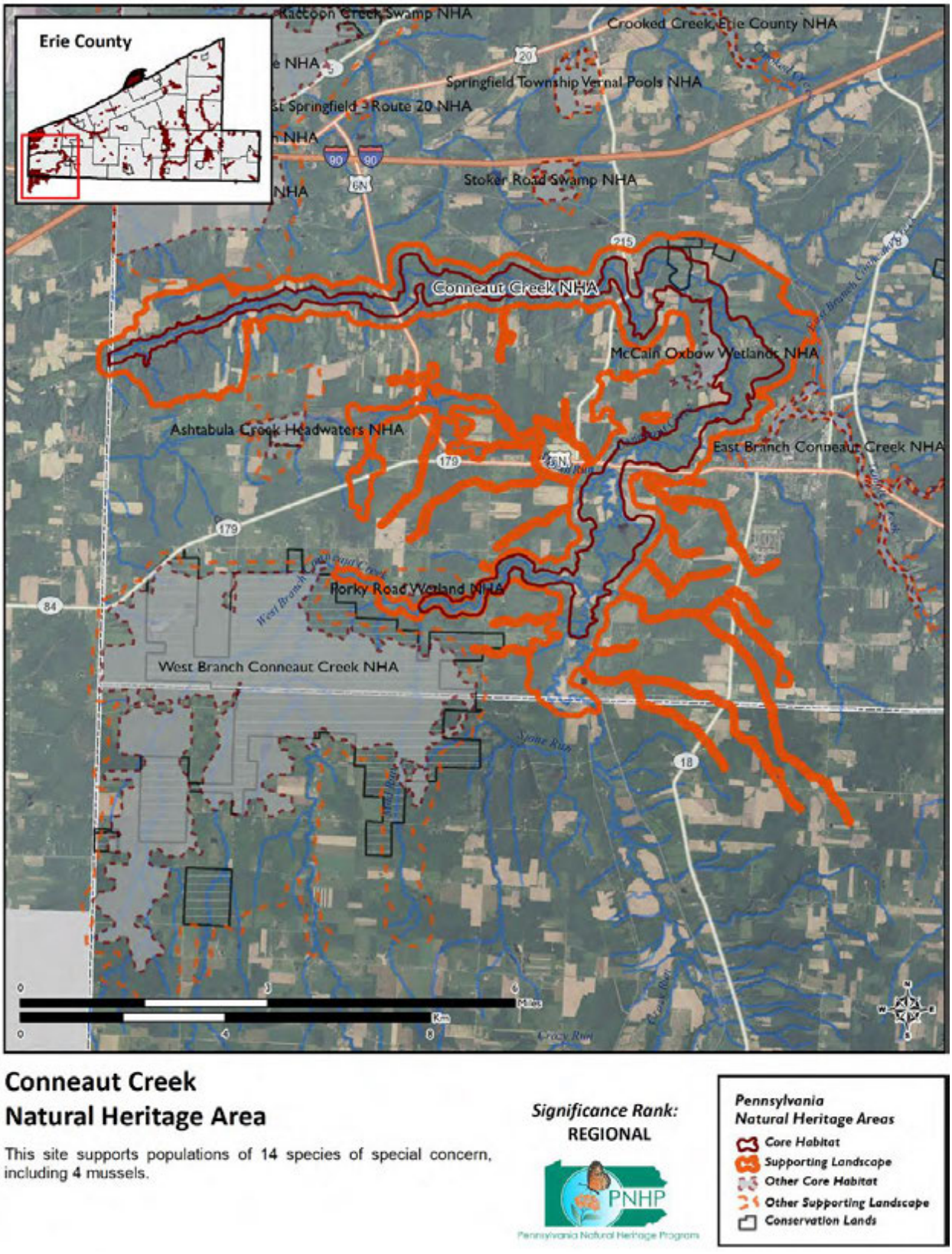

Figure 13. Map of Conneaut Creek Natural Heritage Area (PNHP)

- *National Historic Preservation Act.* The project's impact on cultural resources will be evaluated in accordance with Engineer Regulation (ER) 1105-2-50 and 36 CFR 800. A review of the National Park Service's National Register of Historic Places and the State Historic Preservation Office (SHPO) historic sites databases does not identify any historic properties within the vicinity of the areas being considered for a sea lamprey barrier. The Delaware Nation, Delaware Tribe of Indians, Seneca-Cayuga Nation, Seneca Nation of Indians, Tonawanda Seneca Nation, and Wyandotte Nation are federally recognized Tribal Nations that may have ancestral homelands within the project area. The USACE is consulting with the National Park Service, Pennsylvania Historical Preservation Office (SHPO), and several potentially interested Tribal Nations as part of the NEPA review for this study to determine if there are critical sites or resources that may be impacted within our study area or if additional investigations will be necessary to determine the project's potential for impacting cultural resources. These findings will be thoroughly coordinated with SHPO, THPOs, and interested parties to ensure compliance with Section 106 of the National Historic Preservation Act (NHPA).

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Table 3. Potentially Applicable Federal Environmental Protection Laws, Executive Orders, and Policies.

1. PUBLIC LAWS

a. American Folklife Preservation Act, P.L. 94-201; 20 U.S.C. 2101, *et seq.*
b. American Indian Religious Freedom Act, P.L. 95-341, 42 U.S.C. 1996, *et seq.*
c. Anadromous Fish Conservation Act, P.L. 89-304; 16 U.S.C. 757, *et seq.*
d. Antiquities Act of 1906, P.L. 59-209; 16 U.S.C. 431, *et seq.*
e. Archaeological and Historic Preservation Act, P.L. 93-291; 16 U.S.C. 469, *et seq.* (Also known as the Reservoir Salvage Act of 1960, as amended; P.L. 93-291, as amended; the Moss-Bennett Act; and the Preservation of Historic and Archaeological Data Act of 1974.)
f. Archaeological Resources Protection Act, P.L. 96-95 as amended, 16 U.S.C. 470aa, *et seq*.
g. Bald Eagle Protection Act; 16 U.S.C. 668.
h. Clean Air Act, as amended; P.L. 91-604; 42 U.S.C. 1857h-7, *et seq*.
i. Clean Water Act, P.L. 92-500; 33 U.S.C. 1251, *et seq*. (Also known as the Federal Water Pollution Control Act; and P.L. 92-500, as amended.)
j. Coastal Zone Management Act of 1972, as amended, P.L. 92-583; 16 U.S.C. 1451, *et seq*.
k. Comprehensive Environmental Response, Compensation, and Liability Act, P.L. 96-510, 42 U.S.C. 9601, *et seq*.
l. Endangered Species Act of 1973, as amended, P.L. 93-205; 16 U.S.C. 1531, *et seq*.
m. Energy Independence and Security Act, P.L. 110-140, 42 **U.S.C**. 15821, *et seq*.
n. Energy Policy Act, P.L. 109-58, 42 **USC** 13201, *et seq*.
o. Estuary Protection Act, P.L. 90-454; 16 U.S.C. 1221, *et seq*.
p. Farmland Protection Policy Act, P.L. 97-98, 7 U.S.C. 4201, *et seq*.
q. Federal Environmental Pesticide Control Act, P.L. 92-516; 7 U.S.C. 136.
r. Federal Water Project Recreation Act, as amended, P.L. 89-72; 16 U.S.C. 460-1(12), *et seq*.
s. Fish and Wildlife Coordination Act of 1958, as amended, P.L. 85-624; 16 U.S.C. 661, *et seq*.
t. Historic Sites Act of 1935, as amended, P.L. 74-292; 16 U.S.C. 461, *et seq*.
u. Land and Water Conservation Fund Act, P.L. 88-578; 16 U.S.C. 460/-460/-11, *et seq*.
v. Migratory Bird Conservation Act of 1928; 16 U.S.C. 715.
w. Migratory Bird Treaty Act of 1918; 16 U.S.C. 703, *et seq*.
x. National Environmental Policy Act of 1969, as amended, P.L. 91-190; 42 U.S.C. 4321, *et seq*.
y. National Historic Preservation Act of 1966, as amended, P.L. 89-655; 16 U.S.C. 470a, *et seq*.
z. Native American Graves Protection and Repatriation Act, P.L. 101-601, 25 U.S.C. 3001, *et seq*.
aa. Native American Religious Freedom Act, P.L. 95-341; 42 U.S.C. 1996, *et seq*.
bb. Noise Control Act, P.L. 92-574, 42 U.S.C. 4901, *et seq*.
cc. Resource Conservation and Recovery Act of 1976, P.L. 94-580; 7 U.S.C. 1010, *et seq*.
dd. River and Harbor Act of 1899, 33 U.S.C. 403, *et seq.* (also known as the Refuse Act of 1899)
ee. Toxic Substances Control Act, P.L. 94-469; 15 U.S.C. 2601, *et seq.*
ff. Watershed Protection and Flood Prevention Act, as amended, P.L. 83-566; 16 U.S.C. 1001, *et seq.*
gg. Wild and Scenic Rivers Act, as amended, P.L. 90-542; 16 U.S.C. 1271, *et seq.*

2. EXECUTIVE ORDERS

a. Executive Order 11593, *Protection and Enhancement of the Cultural Environment*, May 13, 1979
b. Executive Order 11988, *Floodplain Management*, May 24, 1977
c. Executive Order 11990, *Protection of Wetlands*, May 24, 1977
d. Executive Order 11514, *Protection and Enhancement of Environmental Quality*, March 5, 1970, as amended by Executive Order 11991, May 24, 1977
e. Executive Order 12088, *Federal Compliance with Pollution Control Standards*, October 13, 1978
f. Executive Order 12372, *Intergovernmental Review of Federal Programs*, July 14, 1982
g. Executive Order 12580, *Superfund Implementation*, January 23, 1987
h. Executive Order 12856, *Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements*, August 3, 1993
i. Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, February 11, 1994
j. Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, April 21, 1997
k. Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, January 10, 2001

l. Executive Order 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, January 24, 2007
m. Executive Order 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, October 5, 2009

3. OTHER FEDERAL POLICIES

a. Council on Environmental Quality Memorandum of August 11, 1980: Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing the National Environmental Policy Act
b. Council on Environmental Quality Memorandum of August 10, 1980: Interagency Consultation to Avoid or Mitigate Adverse Effects on Rivers in the National InventoryMigratory Bird Treaties and other international agreements listed in the Endangered Species Act of 1973, as amended, Section 2(a)(4)

7.0 POINT OF CONTACT

Interested parties are encouraged to contact the USACE-Buffalo District Environmental Analysis Team with any comments regarding the Tonawanda Creek/Erie Canal Hydrilla Control Demonstration Project. Questions or requests for additional information may be directed to:

Buffalo District Environmental Analysis Team

Telephone No.: 800-833-6390, Press 3
E-mail: ConneautCreekGLFER@usace.army.mil

Please review the study information and present any comments in writing within thirty (30) days to the attention of the Buffalo District Environmental Analysis Team to the email address listed above or at the following address:

U.S. Army Corps of Engineers
Buffalo District
1776 Niagara Street
Buffalo, NY 14207-3199

Thank you for your interest and review of this project.

8.0 LITERATURE CITED

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NAME	Title 01	Title 02	Title 03	ADDRESS_LINE_1	ADDRESS_LINE_2	CITY	STATE	POSTAL_CODE
Executive Director	Advisory Council on Historic Preservation	Old Post Office Building, Suite 809		1100 Pennsylvania Ave, NW		Washington	DC	20004-2590
Director	Ecology and Conservation Office	14th St. & Constitution Avenue, NW		HCHB PSP/EC, Room 6117		Washington	DC	20230
Director of Proj. Assistance, NEPA Division	Office of Environmental Guidance	US Department of Energy		1000 Independence Ave, SW - Rm 3G-092		Washington	DC	20585
Director	Office of Environmental Policy & Compliance	Department of the Interior		Main Interior Bldg., MS 2342	1849 C Street, NW	Washington	DC	20240
	U.S Department of State	OES/ENV		2201 C St. West		Washington	DC	20520
Special Programs Group (F-16)	National Center for Environmental Health	Centers for Disease Control & Prevention		4770 Buford Hwy NE		Atlanta	GA	30341-3724
Regional Env Officer - Region 5	Federal Emergency Management Administration			536 S Clark St		Chicago	IL	60605
Midwestern Resource Center	Federal Highway Administration			4749 Lincoln Mall Dr.		Matteson	IL	60443
	Great Lakes Sport Fishing Council			PO Box 297		Elmhurst	IL	60126
Administrator	Region 5	Federal Railroad Administration		200 W Adams St - Suite 320		Chicago	IL	60606
Chief, Review Branch	Region 5	U.S. Environmental Protection Agency		77 W Jackson Blvd		Chicago	IL	60604-3590
NOAA NEPA Coordinator	NOAA PPI/SP	SSMC3 RM: 15603		1315 East West Hwy		Silver Spring	MD	20910-3282
	Great Lakes Commission			1300 Victors Way, Suite 1350		Ann Arbor	MI	48108
	Great Lakes Fishery Commission			2100 Commonwealth Blvd – Suite 209		Ann Arbor	MI	49105-1563
Regional Director	Midwest Region	National Park Service		601 Riverfront Dr		Omaha	NE	68102-4226
Environmental Coordinator	Planning and Compliance Office	Midwest Region	National Park Service	600 Riverfront Dr		Omaha	NE	68102-4225
Regional Director	Northeast Region	National Park Service		1234 Market Street		Philadelphia	PA	19107
Environmental Policy Coordinator	Ohio Department of Natural Resources			2045 Morse Rd, Building D-3		Columbus	OH	43229
Environmental Review Manager	ODNR Environmental Services Section			2045 Morse Rd, Building F-3		Columbus	OH	43229-6693
[redacted]	Aquatic Invasive Species Program Administrator	Ohio Department of Natural Resources	Division of Wildlife	2045 Morse Rd, Building G-3		Columbus	OH	43229-6693
	Ohio Lake Erie Commission			P.O. Box 1049		Columbus	OH	43216-1049
Regional Environmental Officer	Region 3	Federal Emergency Management Administration		615 Chestnut St	1 Independence Mall – 6th F	Philadelphia	PA	19106-4404
Regional Administrator	Region 3	US Environmental Protection Agency		1650 Arch St		Philadelphia	PA	19103-2029
Randy Outward	USDA, Wildlife Services			1501 North Marginal Road		Cleveland	OH	44114-3737
Director	Bureau of Fisheries	PA Fish and Boat Commission		1601 Elmerton Ave		Harrisburg	PA	17110
Director	Bureau of Water Resource Management	PA Dept. of Environmental Protection		P.O. Box 2063		Harrisburg	PA	17120
County Commisioners	Conneaut Township Couthouse			903 Diamond Park		Meadville	PA	16335
Coneaut Twp Supervisors				4026 West Center Road		Linesville	PA	16424
[redacted]	Erie County Soil and Water Conservation District			1927 Wager Rd		Erie	PA	16509
[redacted]	Crawford County Soil and Water Conservation District			Woodcock Creek Nature Center	21742 German Road	Meadville	PA	16335
[redacted]	Environmental Staff	US Dept. of Housing & Urban Development		339 Sixth Ave, Sixth Floor		Pittsburgh	PA	15222-2515
State Conservationist	Natural Resource Conservation Service	US Department of Agriculture		359 East Park Drive, Suite 2		Harrisburg	PA	17111-2747
Director	Northwest Region	Pennsylvania Game Commission		P.O. Box 31		Franklin	PA	16323
[redacted]	Pennsylvania Department of Agriculture	Noxious, Invasive, Poisonous Plant Program		2301 North Cameron Street		Harrisburg	PA	17110
Secretary	Pennsylvania Department of Conservation and Natural Resources			Rachel Carson State Office Bldg. - 7th Floor	P.O. Box 8767	Harrisburg	PA	17105-8767
Secretary	Pennsylvania Department of Environmental Protection			Rachel Carson State Office Building	P.O. Box 2063	Harrisburg	PA	17120
Director	Pennsylvania Department of Environmental Protection	Bureau of Waterways Engineering and Wetlands		P.O. Box 8460	400 Market St, 3rd Floor	Harrisburg	PA	17105-8460
Field Supervisor	Pennsylvania Field Office	U.S. Fish And Wildlife Service		110 Radnor Rd, Suite 101		State College	PA	16801
Executive Director	Pennsylvania Fish and Boat Commission	Northwest Region		11528 State Hwy 98		Meadville	PA	16335
PA Fish and Boat Hatchery				13300 Hartstown Rd		Linesville	PA	16424
State Executive Director	Pennsylvania State Farm Service Agency	US Department of Agriculture		359 East Park Drive, Suite 2		Harrisburg	PA	17111
Division Chief, Environmental Review	PHMC-PA State Historic Preservation Office			400 North Street	Commonwealth Keystone Bu	Harrisburg	PA	17120-0093
	Region 3 U.S. Environmental Protection Agency			1650 Arch Street		Philadelphia	PA	19103
	Western Pennsylvania Conservancy			800 Waterfront Drive		Pittsburgh	PA	15222
NEPA Coordinator	USDA Forest Service	Eastern Region (R9)		626 E Wisconsin Ave		Milwaukee	WI	53202-4616
NEPA Coordinator	Pennsylvania Department of Transportation	Engineering District 1-0		255 Elm Street		Oil City	PA	16301
[redacted] Erie County Executive				140 West Sixth Street	Suite 504	Erie	PA	16501
[redacted] Clerk of Records	Erie County Courthouse			140 West Sixth Street		Erie	PA	16501
[redacted], Clerk of Courts	Judicial Center, 2nd Floor			359 E Center St		Meadville	PA	16335
[redacted] Vice President	NW Region	Pennsylvania Council of Trout Unlimited		1611 Peach Street	Suite 152	Erie	PA	16501
[redacted]	Trout Unlimited President	Emerald Necklace Chapter		26857 Morgan Run		Westlake	OH	44145
[redacted] /Bass Buddies	District VI Chairman	PA Bass Chapter Federation, Inc.		111 Beach Rd		Chicora	PA	16025
[redacted]	League of Ohio Sportsmen			5649 Hunters Ridge Road		Riverside	OH	45431
	Audubon Society of Western Pennsylvania			614 Dorseyville Rd		Pittsburgh	PA	15238
	Presque Isle Audubon Society	c/o TREC		301 Peninsula Drive	Suite 8	Erie	PA	16505
	The Nature Conservancy	Pennsylvania/Delaware Chapter		555 E North Lane	Suite 6030	Conshohoken	PA	19428
	Sierra Club	Pennsylvania Chapter		PO Box 606		Harrisburg	PA	17108
	PA Steelhead Association			PO Box 8892		Erie	PA	16505
	S.O.N.S. of Lake Erie Fishing Club			PO Box 3605		Erie	PA	16508
[redacted] President	Lake Erie Charter Boat Association			6392 Edgewater Drive		Erie	MI	48133
Senator Robert Casey Jr.				393 Russell Senate Office Building		Washington	DC	20510

Senator Patrick Toomey				243 Russell Senate Office Building		Washington	DC	20510
Representative Mike Kelly				1707 Longworth House Office Building		Washington	DC	20515
Representative Mike Kelly				208 E Bayfront Parkway	Suite 102	Erie	PA	16507
Representative Parke Wentling				107 Ryan Office Building	PO Box 202017	Harrisburg	PA	17120-2017
Senator Daniel Laughlin				Senate Box 203049	Room 169 Main Capitol	Harrisburg	PA	17120-3049
Springfield Township Supervisor				13300 Ridge Rd		West Springfield	PA	16443
Conneaut Township Supervisor				12500 Rte 6N		Albion	PA	16401

Delaware Nation	[redacted]	President	P.O. Box 825	Anadarko	OK	73005
Delaware Tribe of Indians	[redacted]	Chief	5100 Tuxedo Blvd	Bartlesville	OK	74006
Seneca Nation of Indians	[redacted]	President	Wm. Seneca Building, 12837 Route 438	Irving	NY	14081
Seneca-Cayuga Nation	[redacted]		23701 S 655 Rd	Grove	OK	74344-6317
Tonawanda Seneca Nation	[redacted]	Chief	7027 Meadville Rd	Basom	NY	14013
Miami Tribe of Oklahoma	[redacted]	Chief	P.O. Box 1326	Miami	OK	74355-1326

NAME	NAME2	ADDRESS1	ADDRESS2	CITY	STATE	ZIPCODE
[redacted]		14999 COLVER RD		WEST SPRINGFIELD	PA	16443
[redacted]		9092 MIDDLE RD		LAKE CITY	PA	16423
[redacted]		510 SEMINOLE DR		ERIE	PA	16505
[redacted]		14843 COLVER RD		WEST SPRINGFIELD	PA	16443
[redacted]		14815 COLVER RD		WEST SPRINGFIELD	PA	16443
[redacted]		1115 US HIGHWAY 174		MARTHAVILLE	LA	71450
[redacted]		14691 COLVER RD		WEST SPRINGFIELD	PA	16443
[redacted]		14430 W CHERRY HILL RD		ALBION	PA	16401
[redacted]		14571 COLVER RD		WEST SPRINGFIELD	PA	16443
[redacted]		14525 COLVER RD		WEST SPRINGFIELD	PA	16443
[redacted]		220 BEACON RD		RENFREW	PA	16053
[redacted]		PO BOX 147		WEST SPRINGFIELD	PA	16443
[redacted]		4561 TOWNLINE RD		GIRARD	PA	16417
[redacted]		14273 COLVER RD		WEST SPRINGFIELD	PA	16443
[redacted]		10290 IVAREA RD		CRANESVILLE	PA	16410
[redacted]		14241 COLVER RD		WEST SPRINGFIELD	PA	16443
[redacted]		14107 COLVER RD		WEST SPRINGFIELD	PA	16443
[redacted]		14055 COLVER RD		WEST SPRINGFIELD	PA	16443
[redacted]		13515 AUBURN RD		NEWBURY	OH	44065
[redacted]		8260 GRIFFEY RD		WEST SPRINGFIELD	PA	16443
[redacted]		13771 COLVER RD		WEST SPRINGFIELD	PA	16443
[redacted]		8135 GRIFFEY RD		WEST SPRINGFIELD	PA	16443
[redacted]		8255 GRIFFEY RD		WEST SPRINGFIELD	PA	16443
[redacted]		7951 GRIFFEY RD		WEST SPRINGFIELD	PA	16443
[redacted]		8235 GRIFFEY RD		WEST SPRINGFIELD	PA	16443
[redacted]		13210 W CHERRY HILL RD		ALBION	PA	16401
[redacted]		8116 HUNTLEY RD		ALBION	PA	16401
[redacted]		8168 HUNTLEY RD		ALBION	PA	16401
[redacted]		13206 W CHERRY HILL RD		ALBION	PA	16401
[redacted]		9625 STATE LINE ROAD		ALBION	PA	16401
[redacted]		13138 W CHERRY HILL RD		ALBION	PA	16401
[redacted]		940 W CONFEDERATE AVE		COLUMBIA	SC	29201
[redacted]		8500 ROUTE 6N		ALBION	PA	16401
[redacted]		8353 ROUTE 6N		ALBION	PA	16401
[redacted]		10140 S AKERLEY RD		ALBION	PA	16401
[redacted]		1961 W 11TH ST		ERIE	PA	16505
[redacted]		13141 CAMBRIDGE SPRINGS RD		EDINBORO	PA	16412
[redacted]		12888 CHERRY HILL RD		ALBION	PA	16401

[redacted]		12888 CHERRY HILL RD		ALBION	PA	16401
[redacted]		118 TIMBERWIND DR		NEW MARKET	AL	35761
[redacted]		12270 CARTER RD		ALBION	PA	16401
[redacted]		22161 TIMBERLINE WAY		LAKE FOREST	CA	92630
[redacted]		9735 SHERMAN RD		ALBION	PA	16401
[redacted]		132 MAIN ST		BROOKVILLE	PA	15825
[redacted]		PO BOX 391		NORTH KINGSVILLE	OH	44068
[redacted]		12163 OLD ALBION RD		GIRARD	PA	16417
[redacted]		12121 OLD ALBION RD		Girard	PA	16417
[redacted]		12029 OLD ALBION RD		GIRARD	PA	16417
[redacted]		12020 WOOD RD		ALBION	PA	16401
[redacted]		11985 OLD ALBION RD		GIRARD	PA	16417
[redacted]		1523 CASCADE ST		ERIE	PA	16502
[redacted]		11910 WOOD ROAD		ALBION	PA	16401
[redacted]		11640 CHERRY HILL RD		ALBION	PA	16401
[redacted]		11768 OLD ALBION RD		GIRARD	PA	16417
[redacted]		9000 ROUTE 215		ALBION	PA	16401
[redacted]		R D 1		ALBION	PA	16401
[redacted]		9013 ROUTE 215		ALBION	PA	16401
[redacted]		9100 BISCOFF RD		ALBION	PA	16401
[redacted]		10067 SAMPSON AVE		LAKE CITY	PA	16423
[redacted]		11613 OLD ALBION RD		GIRARD	PA	16417
[redacted]		10815 THRASHER RD		CRANESVILLE	PA	16410
[redacted]		4477 E LAKE RD		WILSON	NY	14172
[redacted]		9160 OLD ALBION RD		CRANESVILLE	PA	16410
[redacted]		700 CENTER RD		CONNEAUT	OH	44030
[redacted]	C/O WARNER MANAGEMENT COMPANY	PO BOX 586		ANNANDALE	NJ	8801
[redacted]	[redacted]	PO BOX 173859		DENVER	CO	80217
[redacted]	[redacted]	13047 W CHERRY HILL RD		ALBION	PA	16401
[redacted]	[redacted]	1189 SPRING VALLEY DR		ERIE	PA	16509
COMMONWEALTH OF PENNSYLVANIA	PA FISH AND BOAT COMMISSION	[redacted]	1601 ELMERTON AVE	HARRISBURG	PA	17110
[redacted]	[redacted]	4017 LAKE RD	LOT 24	CONNEAUT	OH	44030

[redacted] **CIV USARMY CELRB (USA)**

From: [redacted]
Sent: Monday, August 22, 2022 2:41 PM
To: ConneautCreekGLFER
Cc: [redacted], [redacted]; [redacted], [redacted]
Subject: [Non-DoD Source] EPA's scoping comments on the Conneaut Creek (GLFER) Sea Lamprey Barrier Project.

Thank you for providing the Scoping Information document for the Conneaut Creek Great Lake Fishery and Ecosystem Restoration (GLFER) Sea Lamprey Barrier Project. In accordance with the National Environmental Policy Act (NEPA) of 1969 and the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR 1500-1508), the Environmental Protection Agency (EPA) has the following recommendations for your consideration as you develop the Environmental Assessment (EA) for this project.

Purpose and Need
The scoping document discusses the Great Lakes Fishery Commission (GLFC) strategic vision and 3 pillars of success under its vision statement. It would be helpful for the EA to include a summary of all 3 pillars of success. Additionally, it is stated that the second pillar of success Strategic Goal Number 1 is to "suppress sea lamprey populations to target levels" and that Strategy 5 and 6 address this goal. The EA should include a summary of the other Strategies presented to suppress sea lamprey populations. Providing the GLFC vision statement and full report as an appendix or including a link to its location would benefit the EA.

Proposed Project
The study is evaluating the feasibility of implementing a permanent sea lamprey control alternative that would bring the sea lamprey populations below target levels. The EA would benefit if a discussion was added explaining how the "Lake Erie Fish community objectives for the Great Lakes basin" determined the target level of the sea lamprey population. The discussion could include background information on current and past population levels as well as an explanation or justification of the project's target level goal.

Study Authority
Under Section 506 of the Water Resources Development Act (WRDA) of 2000, as amended by Section 5011 WRDA 2007 there is a requirement for non-federal partners to contribute 35% of the cost of the project and are responsible to provide operation, maintenance, repair, rehabilitation, and replacement of projects. Have non-federal partners been identified that are willing and able to meet this commitment?

Alternatives Considered
Each of the alternatives considered include using an electrical barrier as a primary or secondary barrier. The example given energizes the electrical barrier if the 18 inch vertical drop is compromised due to high water. It is unclear what circumstances would trigger the need to energize each of the alternatives. It would be useful to add that information to Table 1. It would also be useful to discuss how often the Conneaut Creek currently reaches that high water level and therefore, how often it can be anticipated the need to energize the electrical barrier. EPA recommends a robust discussion of the safety of the electrical barriers be included in the EA as well.

Each of the alternatives proposes to use “Trap and Sort” as their primary passage method. How often do each of the traps need to be serviced? Do any of the alternative trap types require more or less active sorting? Do any of the traps do a better job of protecting native species?

As the alternatives are being developed the EA should include information on each alternative’s anticipated footprint, potential area of inundation and potential secondary impacts caused by the need to clear vegetation, install roads or build accompanying structures.

Other Considerations

The scoping document does not identify the location along Conneaut Creek where the proposed project may occur. The EA should provide potential site locations and a discussion as to whether the location may indicate a preference of one alternative barrier type over another. Location could also necessitate additional studies depending on the natural environment of the site.

The alternatives provided all include a permanent physical barrier structure. Is there an opportunity, should the sea lamprey population fall below target levels, that the physical structure can be removed from the Conneaut Creek and the area restored? Could changes to the management of the structures and monitoring methods be implemented once target levels are achieved? We recommend that the EA address how these structures will be managed in the event that they are successful in controlling the sea lamprey population.

Thank you for the opportunity to provide scoping comments on this project. We look forward to working with you as the Environmental Assessment is developed. If you have questions, please feel free to contact me directly at [redacted]

[redacted]
Office of Communities, Tribes & Environmental Assessment
National Environmental Policy Act (NEPA)
U.S. EPA Region III
4 Penn Center
Philadelphia, PA 19103
[redacted]

[redacted] **CIV USARMY CELRB (USA)**

From: [redacted]
Sent: Wednesday, July 27, 2022 10:05 AM
To: ConneautCreekGLFER
Subject: [Non-DoD Source] Conneaut Creek project

To whom it may concern

[redacted] have lived and held property beside Conneaut creek for 35 years and have experienced this creek in all its aspects. They have seen the flood stage go over the 26 foot banks by over 6 feet and have seen levels so low they can walk across the creek on the dry creek bed.

They have looked at your proposal and charts and graphs and do not agree that any of these proposals would be appropriate for their stretch of the creek.

Finally, when first contacted personally about these proposals and hesitated to answer, the contact assured them that it is "still the United States of America" and they have the right of refusal for the government to use their property for access to the creek. They still feel they do not want to participate in your activities on Conneaut creek and do not wish to have their property used as access to the creek.

Thank you

[redacted] **CIV USARMY CELRB (USA)**

From: [redacted]
Sent: Sunday, October 30, 2022 11:02 AM
To: ConneautCreekGLFER
Subject: [Non-DoD Source] GLFER Lamprey Barrier

To whom it may concern,
I was contacted by [redacted], from your office in Buffalo, about the possibility of the the barrier being constructed off of Brown Road.
After discussing this with my family, we believe this will have an adverse effect on our recreational use of our property and possibly its value. Therefore, we are against having it built at that location.
If you need to contact me, my phone number is [redacted].
Thank You,
[redacted]
8250 N. Akerley Road

[redacted] **CIV USARMY CELRB (USA)**

From: [redacted]
Sent: Sunday, July 31, 2022 2:51 PM
To: ConneautCreekGLFER
Subject: [Non-DoD Source] Location and Impact of Barrier Dam

Good Afternoon,
We have read the information you provided about proposed sea lamprey mitigation in Conneaut creek. We are glad that you plan to cease poisoning the creek to kill the lamprey (and everything else). We received your packet in the mail and it looks like you propose to place a barrier dam somewhere close to the Griffey road bridge that crosses the creek. Of course, as landowners on the creek, we have questions. Will the dam be east or west of the bridge? The "flats" along the creek flood every year with spring thaw and rain. Will the debris that comes down the creek at those times impact the function of the dam? Will there be much water retention upstream? Are you looking for a right of way on our property for some kind of maintenance? Where will the "spoil" from the excavation go? Who will be responsible to maintain the integrity and function of the dam? How will that impact the recreation (kayak or canoe) on the creek? Will we be notified prior to construction of the dam even if it's structure is not on our property? Once the actual site and type of dam is selected, will someone from your office meet with us for any other questions that may arise before construction begins? Is there a similar structure going into the creek in Ohio? (It appears that the watershed area of Conneaut creek from the state line to the estuary is twice the size of the area of concern here in Pennsylvania)
We look forward to your reply.

[redacted]
7951 Griffey Road
West Springfield, PA

[redacted] **CIV USARMY CELRB (USA)**

From: ConneautCreekGLFER
Sent: Thursday, November 17, 2022 4:47 PM
To: [redacted] ConneautCreekGLFER
Subject: RE: [Non-DoD Source] Location and Impact of Barrier Dam

[redacted],

I want to thank you for responding to our scoping letter, speaking with me on-site, and attending the last public meeting. I believe we have answered all of these questions or will be as we move through the study and continue to update you along the way. Please do not hesitate to contact me if you have any additional questions or comments.

Sincerely,
[redacted]

[redacted], Fisheries Biologist, Certified Ecologist
Planning Branch - Environmental Analysis Team
US Army Corps of Engineers, Buffalo District
1776 Niagara Street
Buffalo, NY 14217
Office: [redacted]
Cell: [redacted]
E-mail: [redacted]

From: [redacted]
Sent: Sunday, July 31, 2022 2:51 PM
To: ConneautCreekGLFER <ConneautCreekGLFER@usace.army.mil>
Subject: [Non-DoD Source] Location and Impact of Barrier Dam

Good Afternoon,
We have read the information you provided about proposed sea lamprey mitigation in Conneaut creek. We are glad that you plan to cease poisoning the creek to kill the lamprey (and everything else). We received your packet in the mail and it looks like you propose to place a barrier dam somewhere close to the Griffey road bridge that crosses the creek. Of course, as landowners on the creek, we have questions. Will the dam be east or west of the bridge? The "flats" along the creek flood every year with spring thaw and rain. Will the debris that comes down the creek at those times impact the function of the dam? Will there be much water retention upstream? Are you looking for a right of way on our property for some kind of maintenance? Where will the "spoil" from the excavation go? Who will be responsible to maintain the integrity and function of the dam? How will that impact the recreation (kayak or canoe) on the creek? Will we be notified prior to construction of the dam even if it's structure is not on our property? Once the actual site and type of dam is selected, will someone from your office meet with us for any other questions that may arise before construction begins? Is there a similar structure going into the creek in Ohio? (It appears that the watershed area of Conneaut creek from the state line to the estuary is twice the size of the area of concern here in Pennsylvania)
We look forward to your reply.
[redacted]
7951 Griffey Road
West Springfield, PA

CONNEAUT CREEK PROPERTY OWNER MEETING

WEDNESDAY, NOVEMBER 9, 2022

Project partners:

US Army Corps of Engineers
Buffalo District

pennsylvania
FISH AND BOAT COMMISSION

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Sea Grant
Pennsylvania

INTRODUCTIONS

NAME & SOMETHING UNIQUE ABOUT YOURSELF

Project partners:

US Army Corps of Engineers
Buffalo District

pennsylvania
FISH AND BOAT COMMISSION

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Sea Grant
Pennsylvania

MEETING GOALS & GENERAL COMMENTS

- Meeting Goals
  - Engage with property owners at Brown Road and Griffey Road
  - Communicate and receive feedback on barrier types, locations, and impacts
  - Provide sea lamprey program history and treatments
  - Inform on project status and way ahead
  - Identify and address concerns

- General Comments
  - USACE right of entry request is only for investigations, NOT barrier construction access
  - USFWS questionnaire and the USACE right of entry request
  - Increase property owner and public knowledge on current lampricide efforts versus the USACE project that would reduce/eliminate the need for lampricide
  - Inform public and landowners on why Pennsylvania sites were chosen versus Ohio sites
  - Respect property owner concern on right of entry during hunting seasons
  - Public safety

US Army Corps of Engineers ®

U.S.ARMY

Conneaut Creek Ecology and Management

Section 506 Great Lakes Fishery and Ecosystem Restoration

PROJECT DETAILS

Purpose

- To develop a Sea Lamprey control strategy that reduces or eliminates the need to chemically treat Conneaut Creek with lampricide in Pennsylvania.

Motivation

- Lampricide treatment is an effective way to eliminate larval Sea Lamprey, but it can also have negative impacts on nontarget aquatic fauna.
- Collectively, the agencies that are partnering on this project are trying to prevent the proliferation of Sea Lamprey in the Great Lakes while protecting the diverse assemblage of aquatic organisms that call Conneaut Creek home.

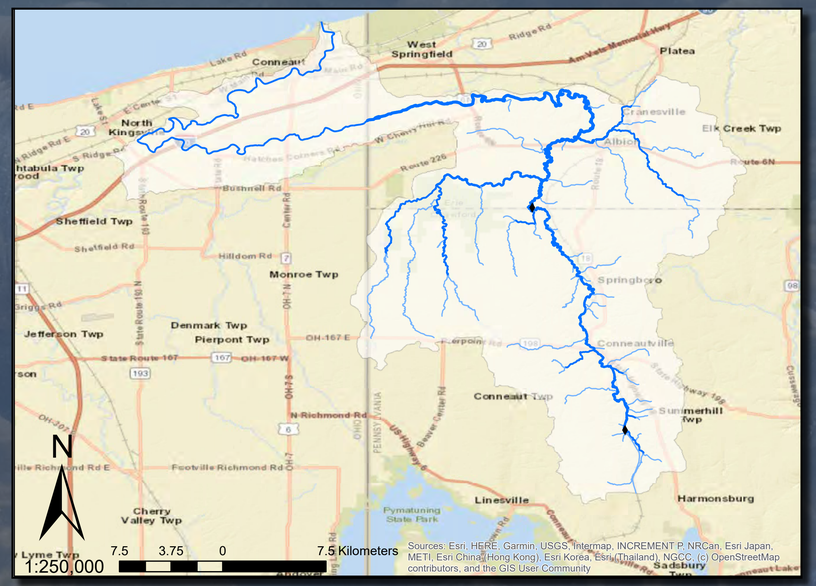
Other Considerations

- We are seeking to optimize the costs and benefits associated with alternative Sea Lamprey control strategies affecting:
  - Sportfish populations
  - Rare, threatened, and endangered Species
  - Impact of a physical barrier in a flowing system
  - Public safety
  - Recreational opportunities

Freshwater mussels from Conneaut Creek, PA, credit – Joe Brancato

Eastern Sand Darter, credit – Rob Criswell

CONNEAUT CREEK



- The Conneaut Creek watershed drains approximately 153 square miles in northwest Pennsylvania and empties into Lake Erie near Conneaut, Ohio.
- Supports a diverse aquatic community including at least 63 species of fish.
- Supports diverse recreation ranging from angling for coldwater species like stocked trout and Steelhead, to angling for warmwater species like Muskellunge and Smallmouth Bass, to paddling the creek in canoes and kayaks.
- Due to the changing habitat and communities from the headwaters to the mouth of Conneaut Creek, it is separated into three fisheries management sections in Pennsylvania.

SPECIES OF CONNEAUT CREEK

- Fish community includes at least six state threatened and endangered species - Northern Brook Lamprey, Redfin Shiner, Hornyhead Chub, Eastern Sand Darter, Spotted Sucker, and Brindled Madtom
- Conneaut Creek also supports numerous mussel species such as the Salamander Mussel, documented in Ohio near the Pennsylvania border
- Mudpuppy, an amphibian of conservation concern, is also found in Conneaut Creek and serves as a host species for the Salamander Mussel

Mudpuppy, credit – Nevin Welte

Native Northern Brook Lamprey, credit – Rob Criswell

Hornyhead Chub, credit – Rob Criswell

Project partners:

US Army Corps of Engineers® Buffalo District

U.S. Fish & Wildlife Service

Great Lakes Fishery Commission

pennsylvania Fish and Boat Commission

pennsylvania Department of Environmental Protection

Ohio Department of Natural Resources Division of Wildlife

Sea Grant Pennsylvania

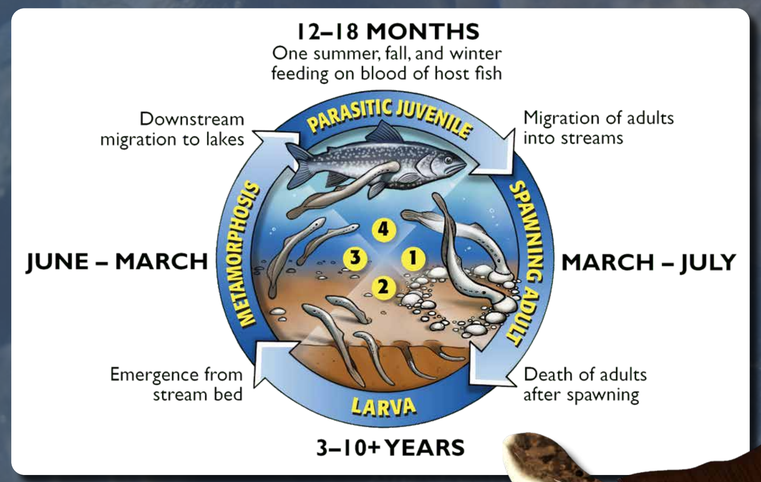
Maintaining Effective Sea Lamprey Control in Conneaut Creek

Section 506 Great Lakes Fishery and Ecosystem Restoration

Lake Erie supports robust recreational, commercial, and tribal fisheries. The annual value of the fishery to the bordering states and province (PA, OH, MI, NY and Ontario, Canada) is estimated to be nearly $3 billion. Invasive sea lampreys, which prey directly on most desirable species of fish, are the greatest threat to the health and sustainability of the fishery. Sea lamprey control has been successfully conducted in the Great Lakes basin since the mid–1950s and has reduced sea lamprey populations by 90% in most areas. Maintaining an effective control program is essential to sustain and improve the fishery and protect the economic benefits it generates.

Sea Lamprey Life History

- Between March and July (depending on water temperatures) adults will return to rivers to spawn and eventually die.
- Larvae burrow into the stream bed and filter feed for anywhere from 3 to 10 or more years.
- Once sea lampreys emerge from the stream bed, they have transformed into a parasitic juvenile. They migrate to the Great Lakes to begin feeding on fish.
- Once in the Great Lakes, sea lampreys spend between 12 and 18 months feeding on fish before they migrate back into streams and begin the cycle again.



Sea Lamprey Damage

- Each sea lamprey can kill up to 40 lbs of fish.
- Before control, sea lampreys were responsible for killing over 100 million pounds of Great Lakes fish each year.
- Sea lampreys attack valuable fish species in Lake Erie including lake trout, burbot, walleye, yellow perch, smallmouth bass, whitefish, salmon, steelhead, and sturgeon.
- Due to the pandemic, lampricide treatments could only be conducted on two Lake Erie tributaries in 2020 and 2021.

Sea Lamprey Control in Conneaut Creek

- Currently, nearly 70 miles of Conneaut Creek are infested with larval sea lampreys. Left untreated, more than 6,500 parasitic sea lampreys will enter Lake Erie from this system.
- Conneaut Creek has been treated with lampricide 11 times since 1986.
- Current lampricide treatments cost $188,000 and are required every 3-5 years.
- A new barrier would remove 43-47 miles of stream from future lampricide treatments.
- Bessemer Dam protects a population of Northern Brook Lamprey, an endangered species in Pennsylvania.

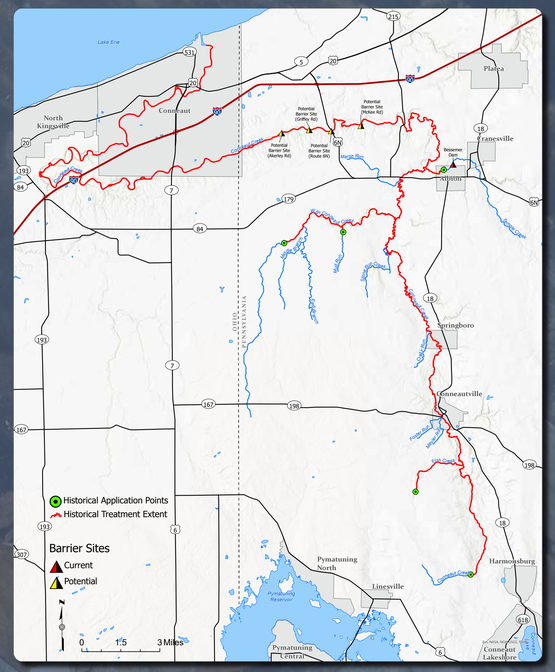


Figure 1. Sea lamprey infestation in Conneaut Creek; red line indicates historical treatment area, green dots identify historical treatment locations.

Project partners:

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Sea Grant Pennsylvania

Conneaut Creek Sea Lamprey Barrier

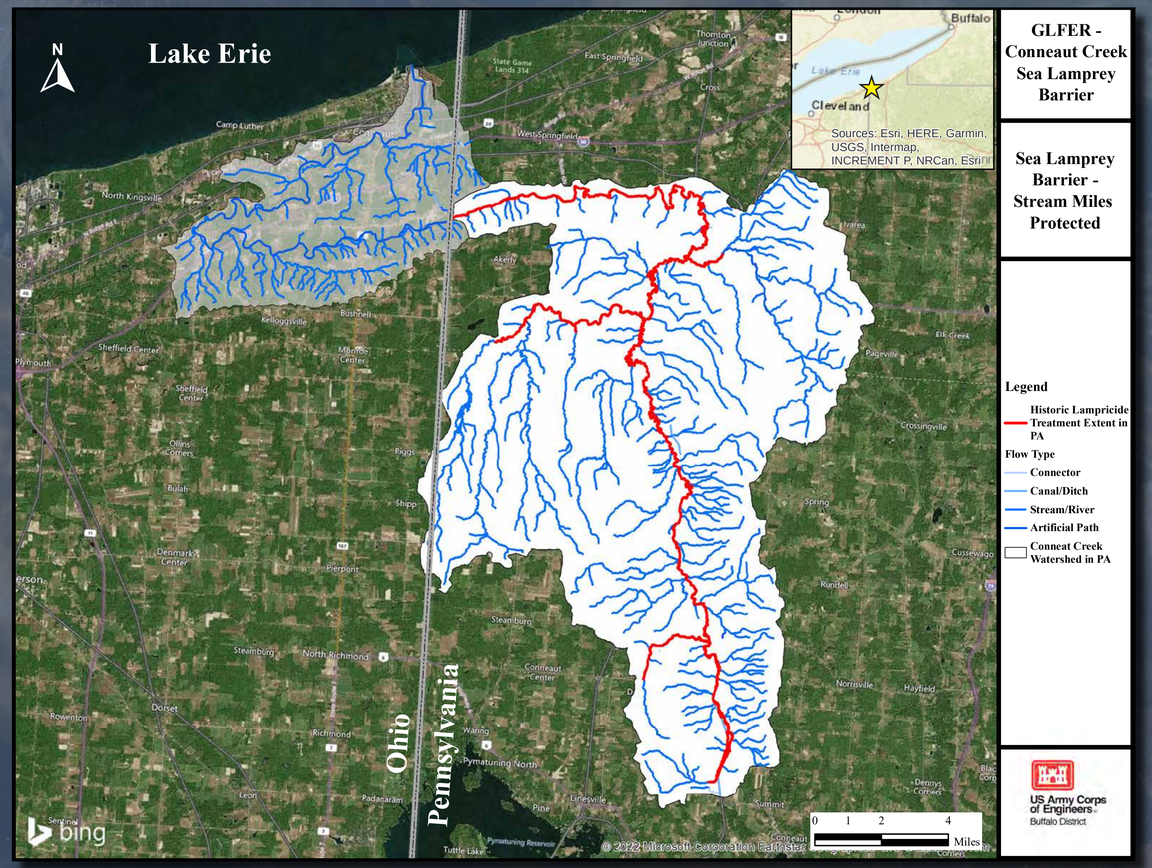
Section 506 Great Lakes Fishery and Ecosystem Restoration

FEASIBILTY STUDY

- The U.S. Army Corps of Engineers (USACE), Buffalo District and partners are investigating the feasibility of implementing a permanent sea lamprey control alternative in Conneaut Creek, Pennsylvania.
- The USACE planning process is a structured approach to problem solving, whereby the steps may be iterated one or more times as new information or new alternatives are developed or as planning objectives are reevaluated.
- The USACE conducts studies in a open and transparent way to obtain public information, opinions, understanding, trust and mutual cooperation, and must provide the public with opportunities to participate throughout the planning process.

OBJECTIVES

- Prevent or significantly reduce the number of sea lamprey from reaching nearly 50 river miles of Conneaut Creek where they currently reproduce and mature before returning to Lake Erie
- Reduce need to use lampricide, reducing negative impacts to native species
- Maintain or improve the stream habitat quality for desirable fish species



PROJECT SCHEDULE*	
Completed FID	June 2021
Executed FCSA	October 2021
Received Federal and Non-Federal Funds	October 2021
Detailed Project Report	October 2023
Execute PPA	February 2024
Plans & Specs	June 2024
Contract Award	October 2024
Start Construction	June 2025
Construction Completed	October 2025
Project Closeout	March 2026

* Note: Estimated dates contingent on funding & environmental window for construction

Project partners:

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Section 506 Great Lakes Fishery and Ecosystem Restoration

SEA LAMPREY BARRIERS

Fixed-Crest Barriers use an uninterrupted fixed-crest height and overhanging lip to maintain a vertical drop from the barrier crest to the tailwater elevation.

- Oldest and most common (39 total) barrier type in the Great Lakes basin
- Block upstream movement of adult sea lamprey as well as many non-target species
- Jumping pools and fishways are needed to maintain fish passage for desired species

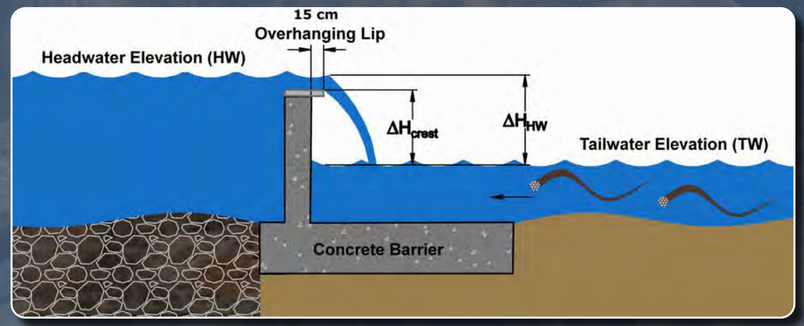


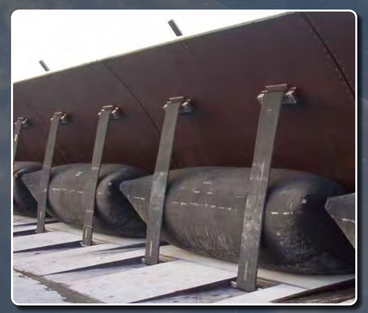
Diagram of typical fixed-crest sea lamprey barrier illustrating the difference between hydraulic head and vertical differential between barrier crest and tailwater elevation (*Source: Zielinski et al, 2019*)

Fixed-crest barriers at (A) Trail Creek, Indiana and (B) Carp Lake Outlet, Michigan

Seasonal and Adjustable-Crest Barriers are similar to fixed-crest barriers, but the crest can be adjusted manually or automatically.

- Can be raised seasonally to block sea lamprey adults during spawning period then lowered to pass flow, debris, sediment, and non-jumping resident fish

Big Carp River inflatable-crest barrier, (A) not operating with inflatable barrier down, (B) in the operating position with barrier raised (*Source: Zielinski et al, 2019*)



Obermeyer adjustable barrier (*Source: Obermeyerhydro.com*)

Inflatable rubber adjustable barrier (*Source: Obermeyer.com*)

Hybrid Barriers combine two or more barrier technologies to increase effectiveness and minimize impacts to hydrology and biologic connectivity.

- Fixed-crest and electrical barrier installed on the Ocqueoc River has been very effective at blocking sea lamprey while allowing upstream passage of steelhead trout and other species

Combined fixed-crest and electric barrier on the Ocqueoc River, Michigan (*Source: Zielinski et al, 2019*)

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Conneaut Creek Sea Lamprey Barrier

Section 506 Great Lakes Fishery and Ecosystem Restoration

SURVEYS NEEDED TO COMPLETE THE FEASIBILITY STUDY

- Survey creek elevations at regular intervals thoughout the study area (no ground disturbance)
- Instream and floodplain habitat and biologic assessments (no ground disturbance)
- Cultural resource surveys and geotechnical investigations once a site or few sites are selected for the barrier (minimal ground disturbance)

RIGHTS OF ENTRY

RIGHTS OF ENTRY are for SURVEY purposes ONLY.

- Signing a Right of Entry for survey purposes DOES NOT grant the United States Federal Government or ANY State or Local Agency the right to use the property identified in the Right of Entry for construction related to this project.
- The surveys to be conducted are NON-INVASIVE in nature. The purpose of the surveys is data collection pertaining to the physical characteristics and natural resources of Conneaut Creek. All survey equipment is handheld and can be carried onto and out of the property by foot.

The Rights of Entry grant the Government the right:

- To enter onto the identified property for the time period described on the right of entry,
- To retain the ownership of data collection tools used for the survey, and
- To financially compensate for any damage done to the property during the act of surveying.

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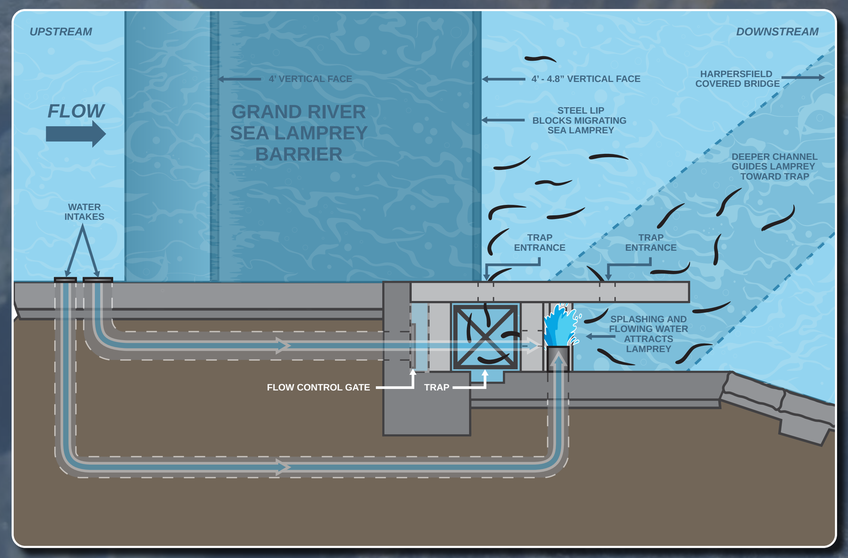
Section 506 Great Lakes Fishery and Ecosystem Restoration

TRAPS

- Used to assess sea lamprey spawning populations each year during the spawning run (March-June) and determine effectiveness of controls.
- Allow removal of lamprey downstream of the barrier to reduce spawning populations and potentially spawning success in downstream areas of the creek.
- Native fish that are caught in traps can be sorted and passed upstream of the barrier to reduce any negative impacts of the barrier to native fish and other aquatic species populations (e.g. freshwater mussels).

Trap



FISHWAYS

- Seasonally operated to allow fish to freely migrate upstream of the barrier after the sea lamprey spawning run.
- Fish traps can be incorporated into the fishway to ensure native fish species are sorted and passed upstream of the barrier during the sea lamprey run.

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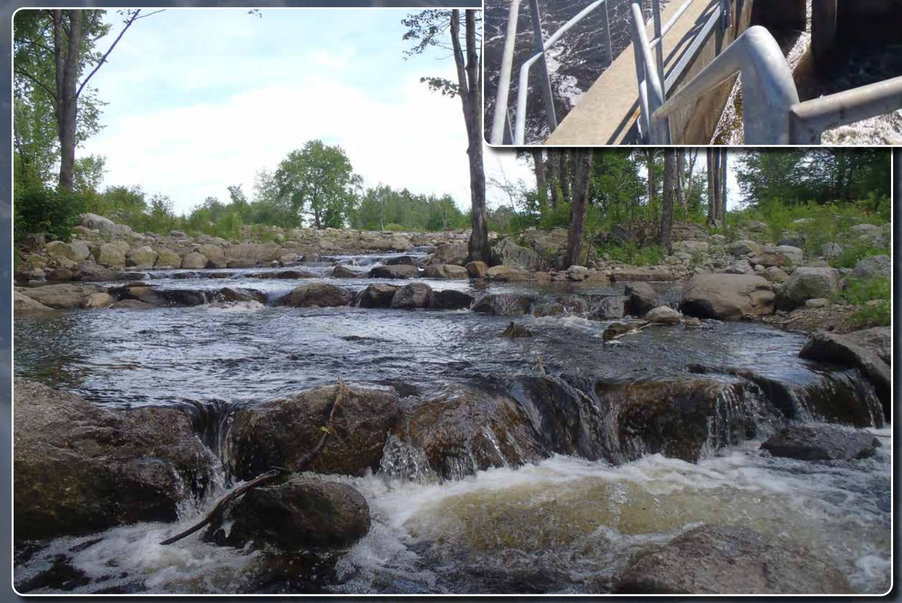
StanChem Dam Fishway on the Mattabesset River in East Berlin, CT (Source: The Connecticut River Salmon Assoc.)

Nature-Like Bypass



(Source: USFWS, Northeast Region)

Vertical Slot

(Source: USFWS, Northeast Region)

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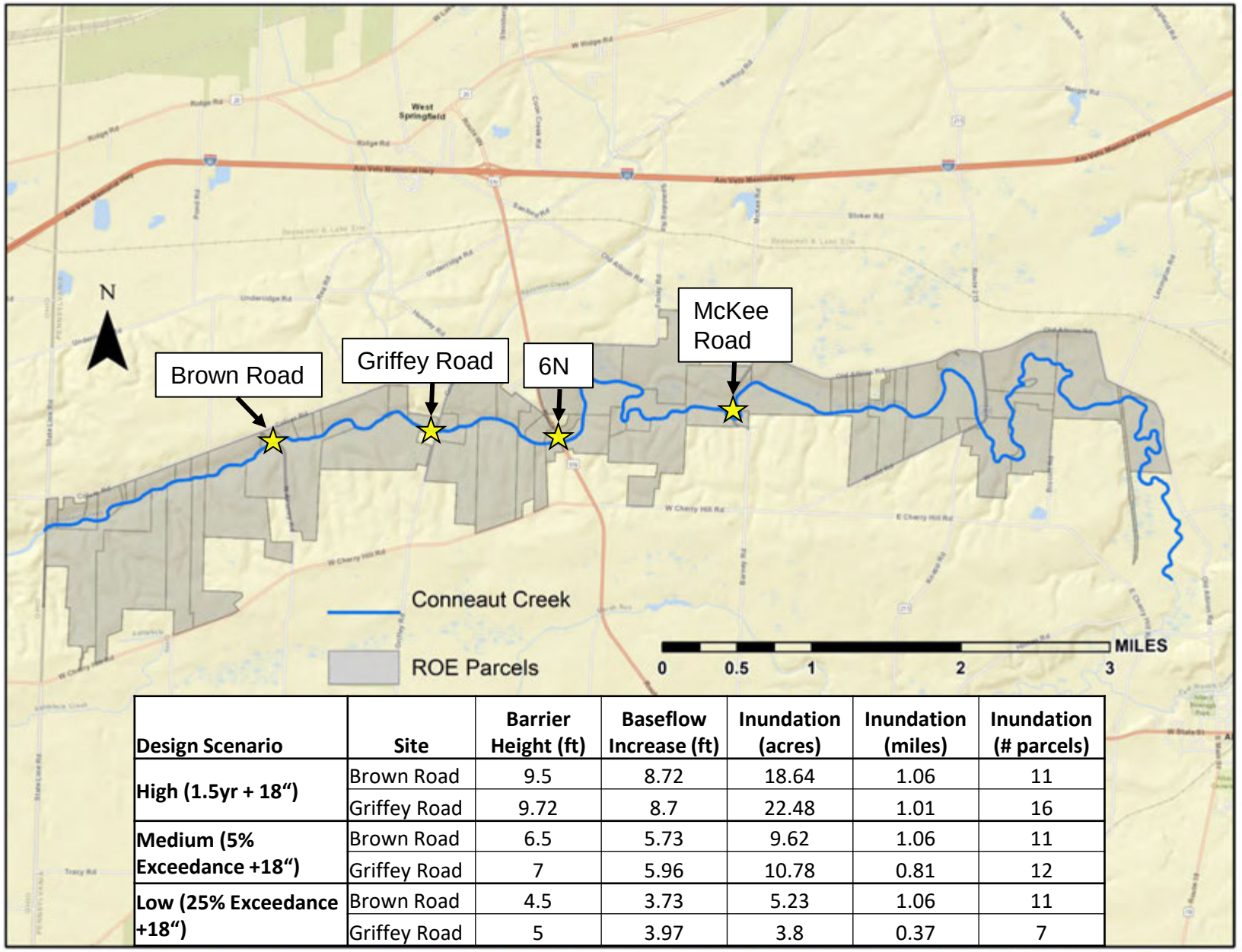
LOCATIONS (USACE)

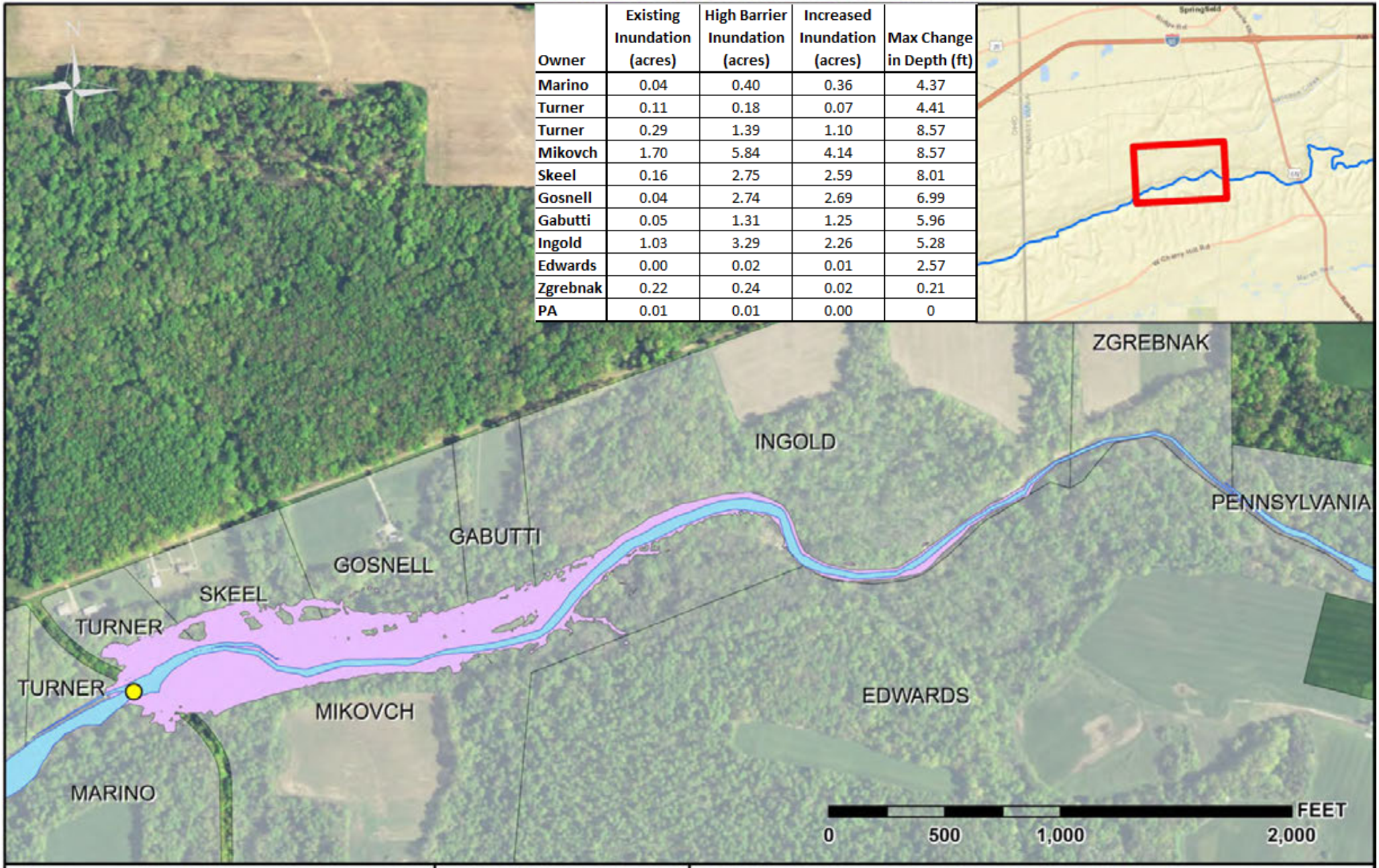
- Brown Road and Griffey Road are the preferred sites based upon the following criteria
  - Length of creek protected
  - Structure height required
  - Upstream inundation distance and area
  - Number of properties impacted by inundation
  - Accessibility

- Brown Road and Griffey Road represent the sites that minimizes structure height and width, level of upstream inundation, and properties impacted by inundation, while providing one of the highest lengths of creek protected



Design Scenario	Site	Barrier Height (ft)	Baseflow Increase (ft)	Inundation (acres)	Inundation (miles)	Inundation (# parcels)
High (1.5yr + 18“)	Brown Road	9.5	8.72	18.64	1.06	11
	Griffey Road	9.72	8.7	22.48	1.01	16
Medium (5% Exceedance +18“)	Brown Road	6.5	5.73	9.62	1.06	11
	Griffey Road	7	5.96	10.78	0.81	12
Low (25% Exceedance +18“)	Brown Road	4.5	3.73	5.23	1.06	11
	Griffey Road	5	3.97	3.8	0.37	7

Owner	Existing Inundation (acres)	High Barrier Inundation (acres)	Increased Inundation (acres)	Max Change in Depth (ft)
Marino	0.04	0.40	0.36	4.37
Turner	0.11	0.18	0.07	4.41
Turner	0.29	1.39	1.10	8.57
Mikovch	1.70	5.84	4.14	8.57
Skeel	0.16	2.75	2.59	8.01
Gosnell	0.04	2.74	2.69	6.99
Gabutti	0.05	1.31	1.25	5.96
Ingold	1.03	3.29	2.26	5.28
Edwards	0.00	0.02	0.01	2.57
Zgrebnak	0.22	0.24	0.02	0.21
PA	0.01	0.01	0.00	0



Legend

- Brown Rd Barrier Location
- Conneaut Creek Parcels
- Existing Conditions
- High Barrier Height

US Army Corps of Engineers
Buffalo District

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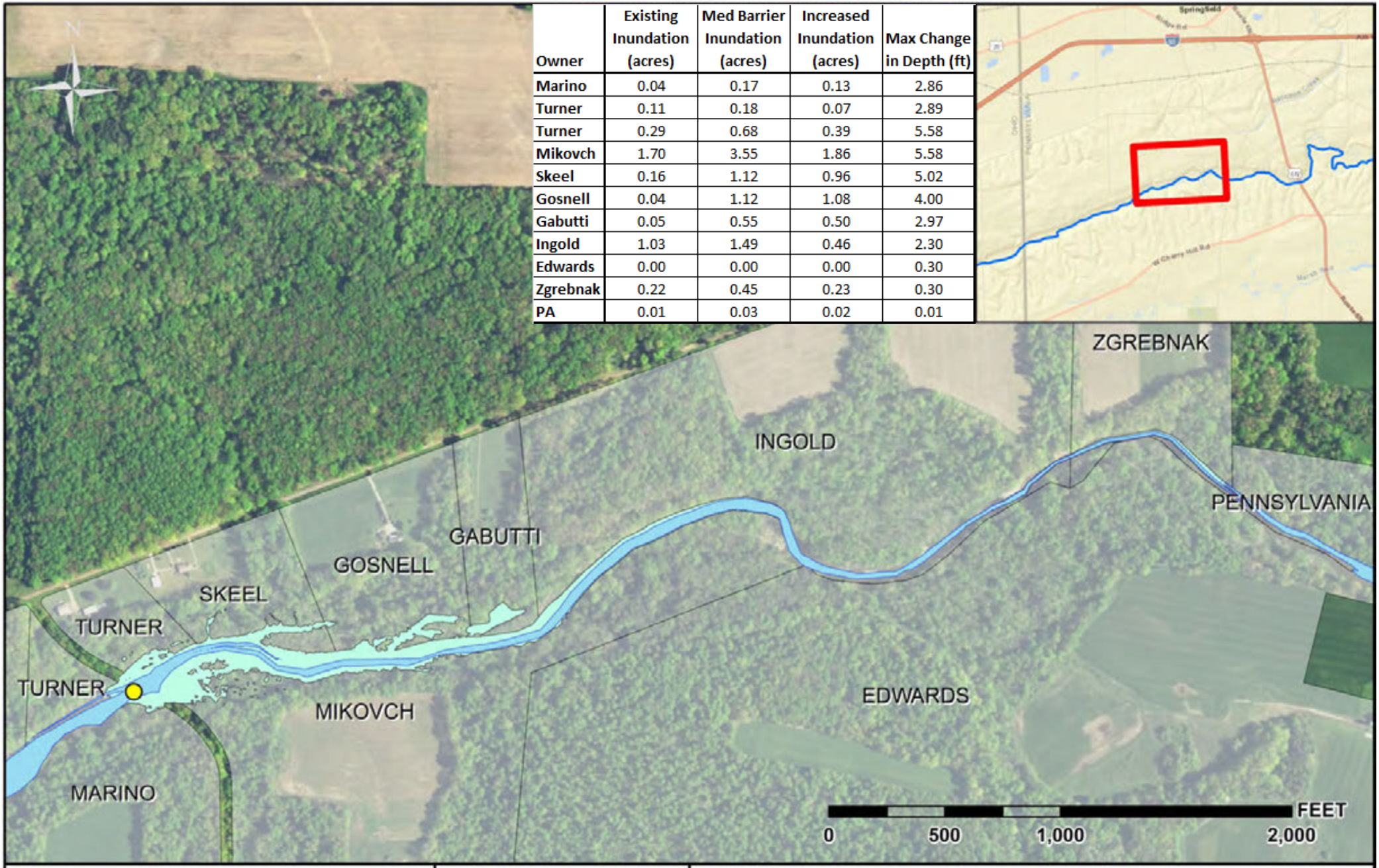
Permanent Inundation Associated with Conneaut Creek Sea Lamprey Barrier Heights

Conneaut Sea Lamprey Barrier
Erie County, Pennsylvania

Owner	Existing Inundation (acres)	Med Barrier Inundation (acres)	Increased Inundation (acres)	Max Change in Depth (ft)
Marino	0.04	0.17	0.13	2.86
Turner	0.11	0.18	0.07	2.89
Turner	0.29	0.68	0.39	5.58
Mikovch	1.70	3.55	1.86	5.58
Skeel	0.16	1.12	0.96	5.02
Gosnell	0.04	1.12	1.08	4.00
Gabutti	0.05	0.55	0.50	2.97
Ingold	1.03	1.49	0.46	2.30
Edwards	0.00	0.00	0.00	0.30
Zgrebnak	0.22	0.45	0.23	0.30
PA	0.01	0.03	0.02	0.01



Legend

- Brown Rd Barrier Location
- Conneaut Creek Parcels
- Existing Conditions
- Medium Barrier Height

US Army Corps of Engineers
Buffalo District

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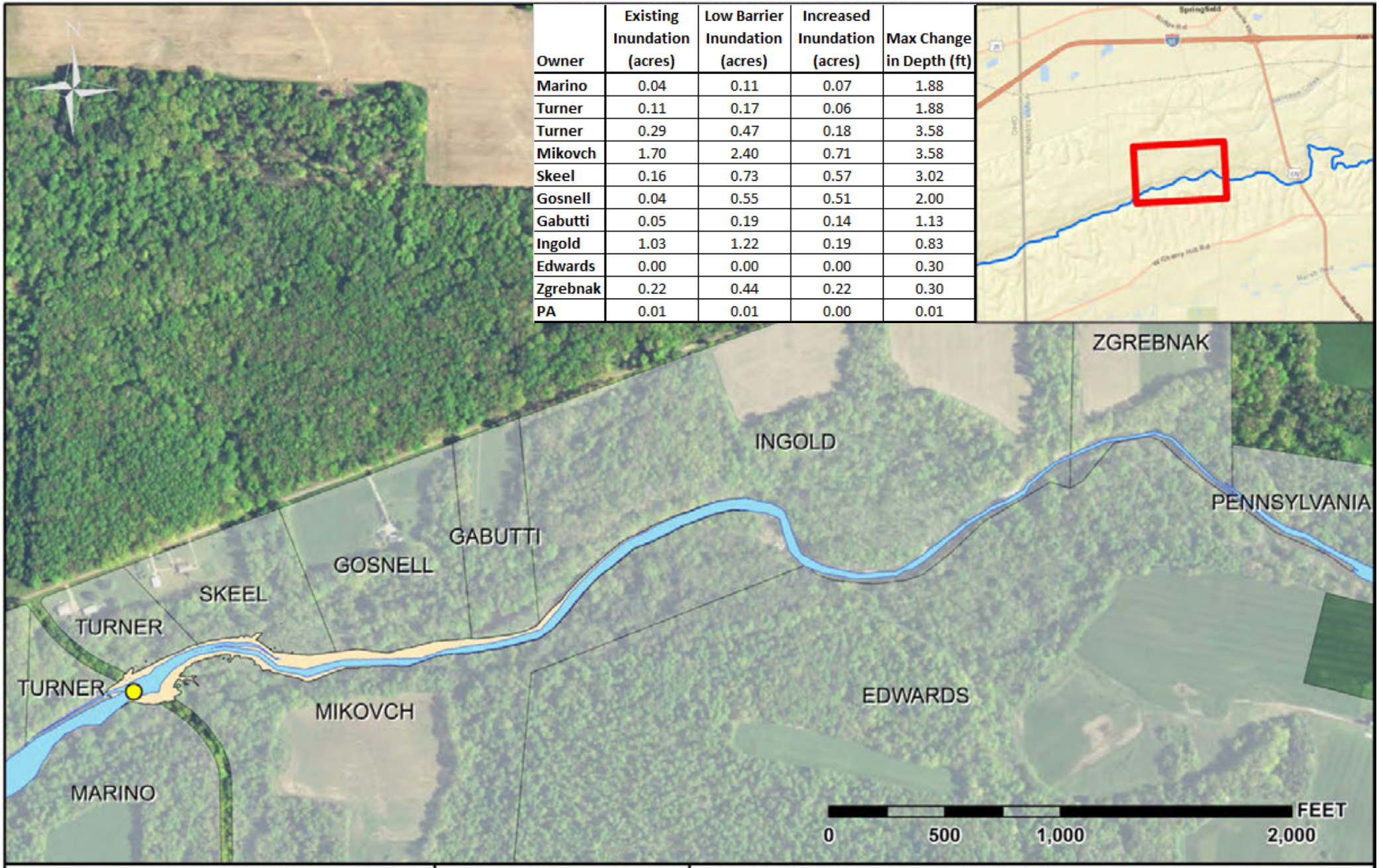
Permanent Inundation Associated with Conneaut Creek Sea Lamprey Barrier Heights

Conneaut Sea Lamprey Barrier
Erie County, Pennsylvania

Owner	Existing Inundation (acres)	Low Barrier Inundation (acres)	Increased Inundation (acres)	Max Change in Depth (ft)
Marino	0.04	0.11	0.07	1.88
Turner	0.11	0.17	0.06	1.88
Turner	0.29	0.47	0.18	3.58
Mikovch	1.70	2.40	0.71	3.58
Skeel	0.16	0.73	0.57	3.02
Gosnell	0.04	0.55	0.51	2.00
Gabutti	0.05	0.19	0.14	1.13
Ingold	1.03	1.22	0.19	0.83
Edwards	0.00	0.00	0.00	0.30
Zgrebnak	0.22	0.44	0.22	0.30
PA	0.01	0.01	0.00	0.01



Legend

- Brown Rd Barrier Location
- Conneaut Creek Parcels
- Existing Conditions
- Low Barrier Height

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Buffalo District

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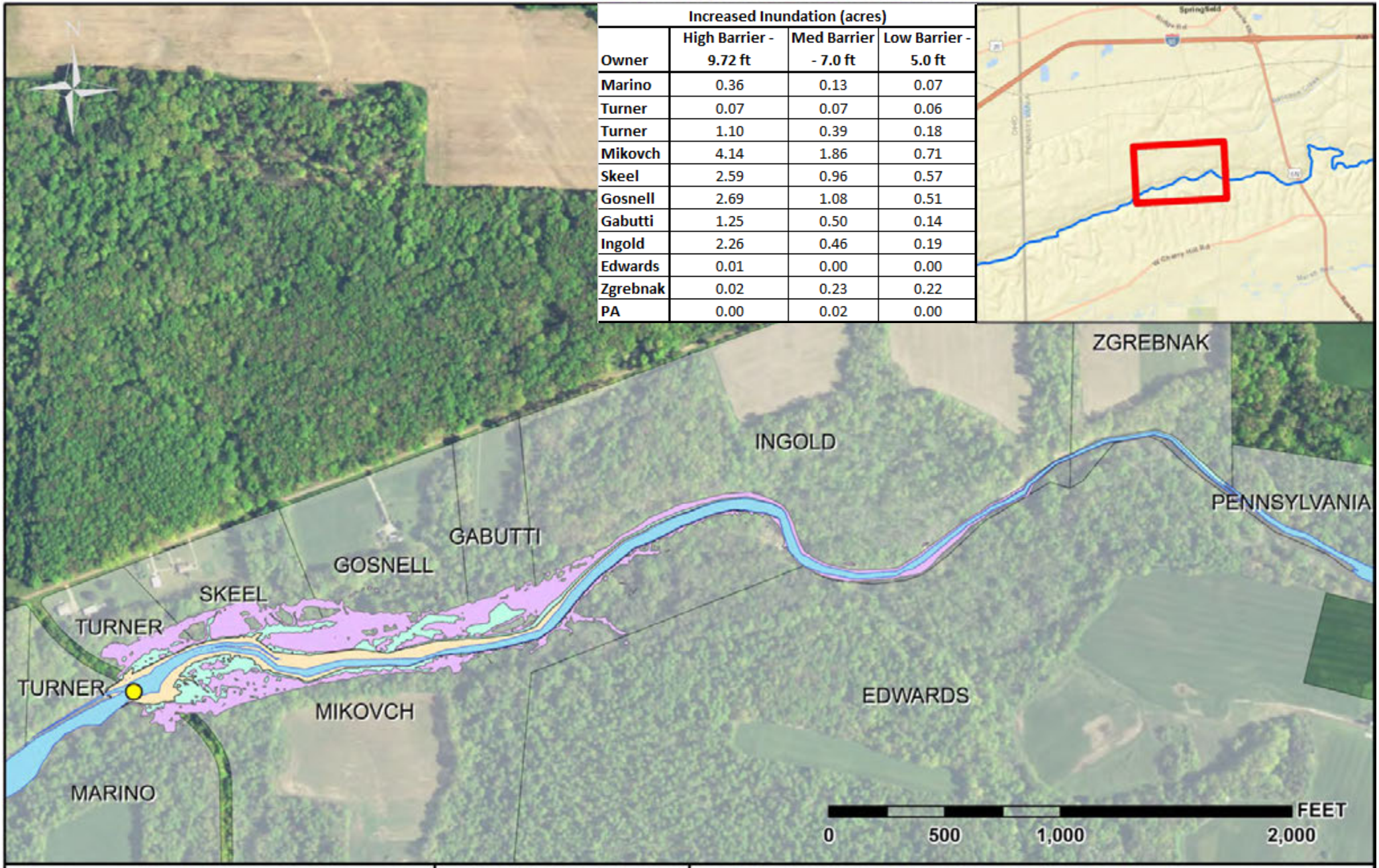
Permanent Inundation Associated with Conneaut Creek Sea Lamprey Barrier Heights

Conneaut Sea Lamprey Barrier
Erie County, Pennsylvania

Increased Inundation (acres)			
Owner	High Barrier - 9.72 ft	Med Barrier - 7.0 ft	Low Barrier - 5.0 ft
Marino	0.36	0.13	0.07
Turner	0.07	0.07	0.06
Turner	1.10	0.39	0.18
Mikovch	4.14	1.86	0.71
Skeel	2.59	0.96	0.57
Gosnell	2.69	1.08	0.51
Gabutti	1.25	0.50	0.14
Ingold	2.26	0.46	0.19
Edwards	0.01	0.00	0.00
Zgrebnak	0.02	0.23	0.22
PA	0.00	0.02	0.00



Legend

- Brown Rd Barrier
- Conneaut Creek Parcels
- Existing Conditions
- Low Barrier Height
- Medium Barrier Height
- High Barrier Height

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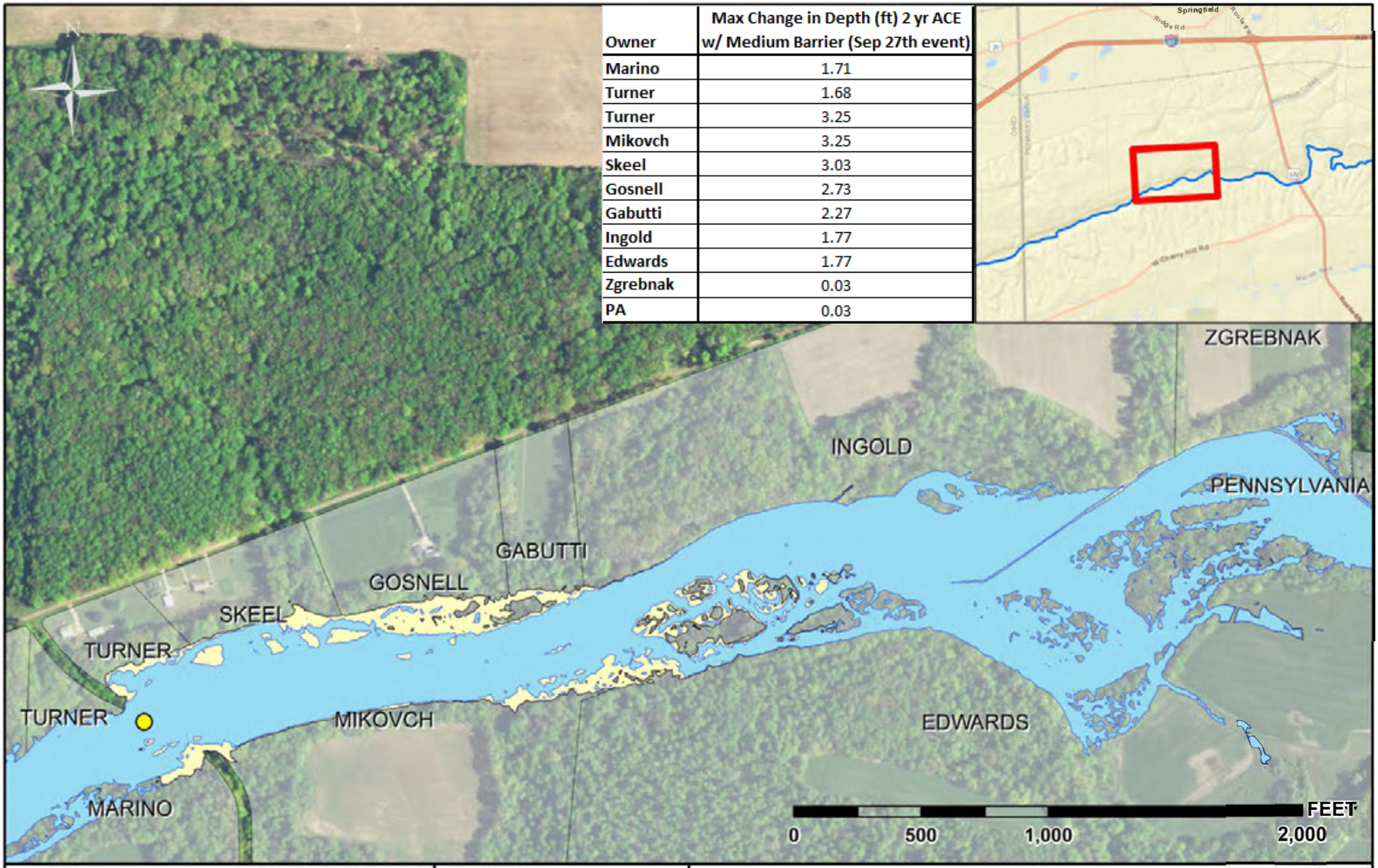
Permanent Inundation Associated with Conneaut Creek Sea Lamprey Barrier Heights

Conneaut Sea Lamprey Barrier
Erie County, Pennsylvania

Owner	Max Change in Depth (ft) 2 yr ACE w/ Medium Barrier (Sep 27th event)
Marino	1.71
Turner	1.68
Turner	3.25
Mikovch	3.25
Skeel	3.03
Gosnell	2.73
Gabutti	2.27
Ingold	1.77
Edwards	1.77
Zgrebnak	0.03
PA	0.03



Legend

- Brown Rd Barrier
- Conneaut Creek Parcels
- Existing Conditions
- Medium Barrier Inundaiton

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Buffalo District

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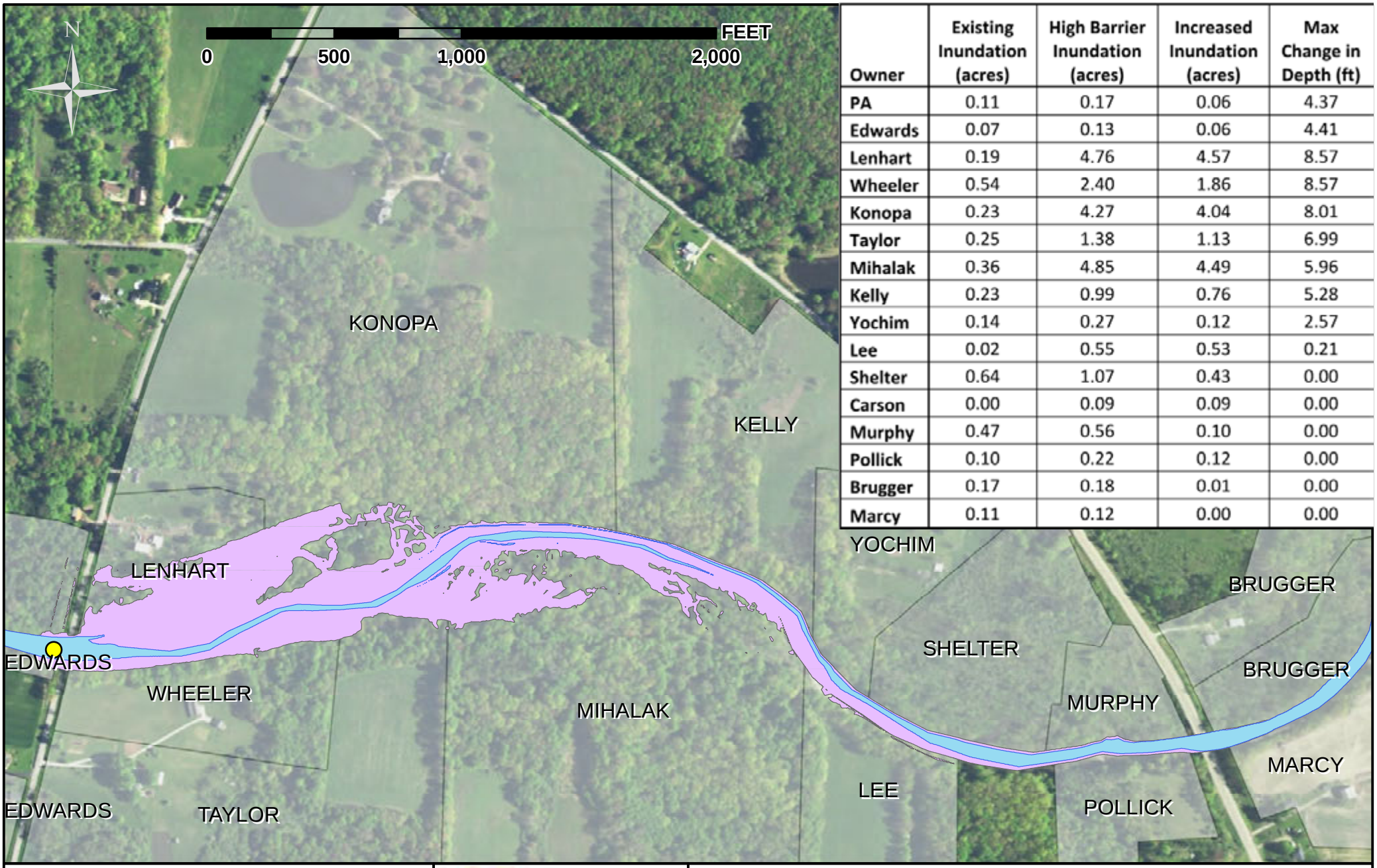
2 Year ACE Event Inundation with Medium Sea Lamprey Barrier Height

Conneaut Sea Lamprey Barrier
Erie County, Pennsylvania



Owner	Existing Inundation (acres)	High Barrier Inundation (acres)	Increased Inundation (acres)	Max Change in Depth (ft)
PA	0.11	0.17	0.06	4.37
Edwards	0.07	0.13	0.06	4.41
Lenhart	0.19	4.76	4.57	8.57
Wheeler	0.54	2.40	1.86	8.57
Konopa	0.23	4.27	4.04	8.01
Taylor	0.25	1.38	1.13	6.99
Mihalak	0.36	4.85	4.49	5.96
Kelly	0.23	0.99	0.76	5.28
Yochim	0.14	0.27	0.12	2.57
Lee	0.02	0.55	0.53	0.21
Shelter	0.64	1.07	0.43	0.00
Carson	0.00	0.09	0.09	0.00
Murphy	0.47	0.56	0.10	0.00
Pollick	0.10	0.22	0.12	0.00
Brugger	0.17	0.18	0.01	0.00
Marcy	0.11	0.12	0.00	0.00

Legend

- Griffey Road Barrier
- Conneaut Creek Parcels
- Existing Conditions
- High Barrier Height

US Army Corps of Engineers
Buffalo District

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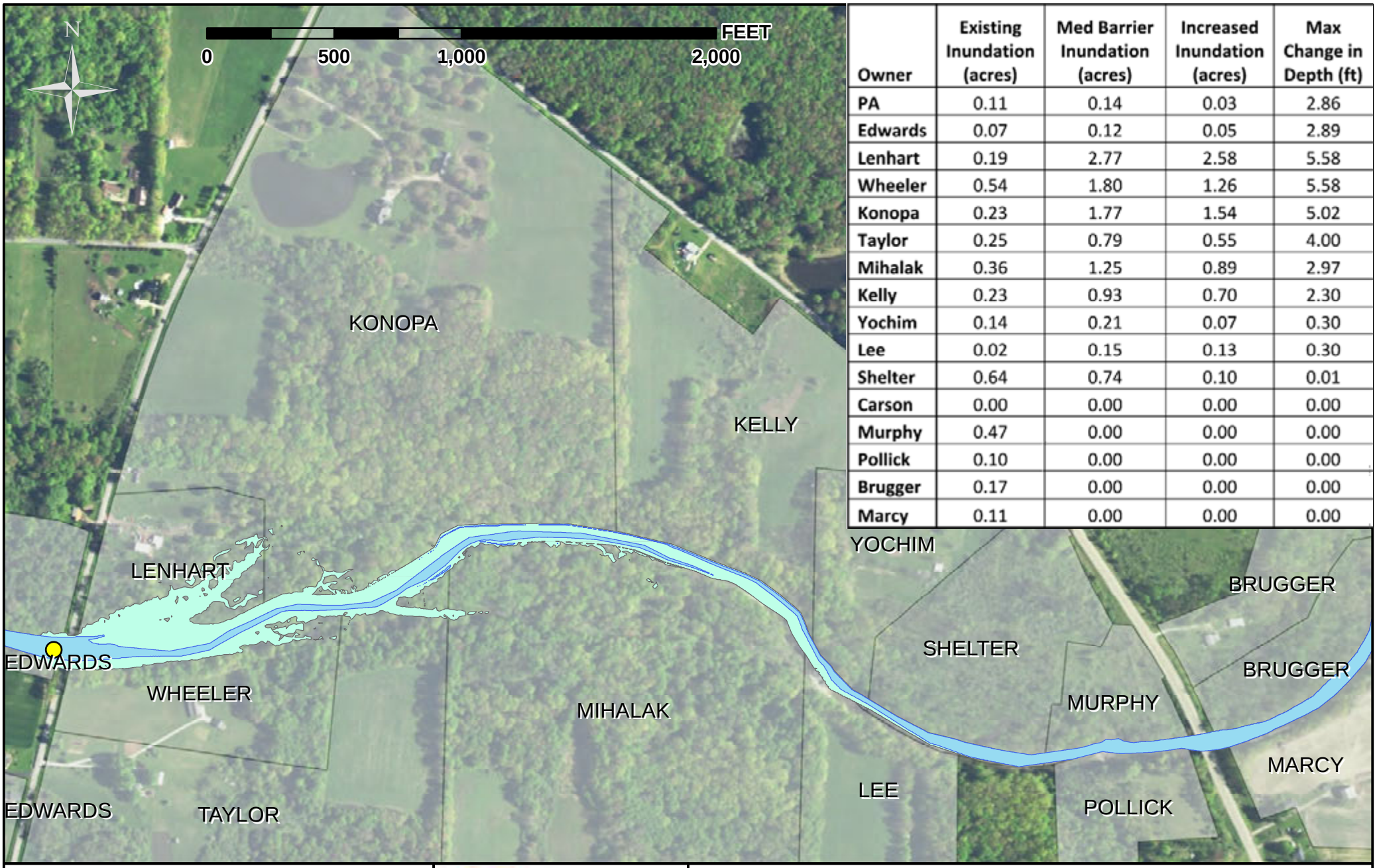
Permanent Inundation Associated with Conneaut Creek Sea Lamprey Barrier Heights

Conneaut Sea Lamprey Barrier
Erie County, Pennsylvania



Owner	Existing Inundation (acres)	Med Barrier Inundation (acres)	Increased Inundation (acres)	Max Change in Depth (ft)
PA	0.11	0.14	0.03	2.86
Edwards	0.07	0.12	0.05	2.89
Lenhart	0.19	2.77	2.58	5.58
Wheeler	0.54	1.80	1.26	5.58
Konopa	0.23	1.77	1.54	5.02
Taylor	0.25	0.79	0.55	4.00
Mihalak	0.36	1.25	0.89	2.97
Kelly	0.23	0.93	0.70	2.30
Yochim	0.14	0.21	0.07	0.30
Lee	0.02	0.15	0.13	0.30
Shelter	0.64	0.74	0.10	0.01
Carson	0.00	0.00	0.00	0.00
Murphy	0.47	0.00	0.00	0.00
Pollick	0.10	0.00	0.00	0.00
Brugger	0.17	0.00	0.00	0.00
Marcy	0.11	0.00	0.00	0.00

Legend

- Griffey Road Barrier
- Conneaut Creek Parcels
- Existing Conditions
- Medium Barrier Height

US Army Corps of Engineers
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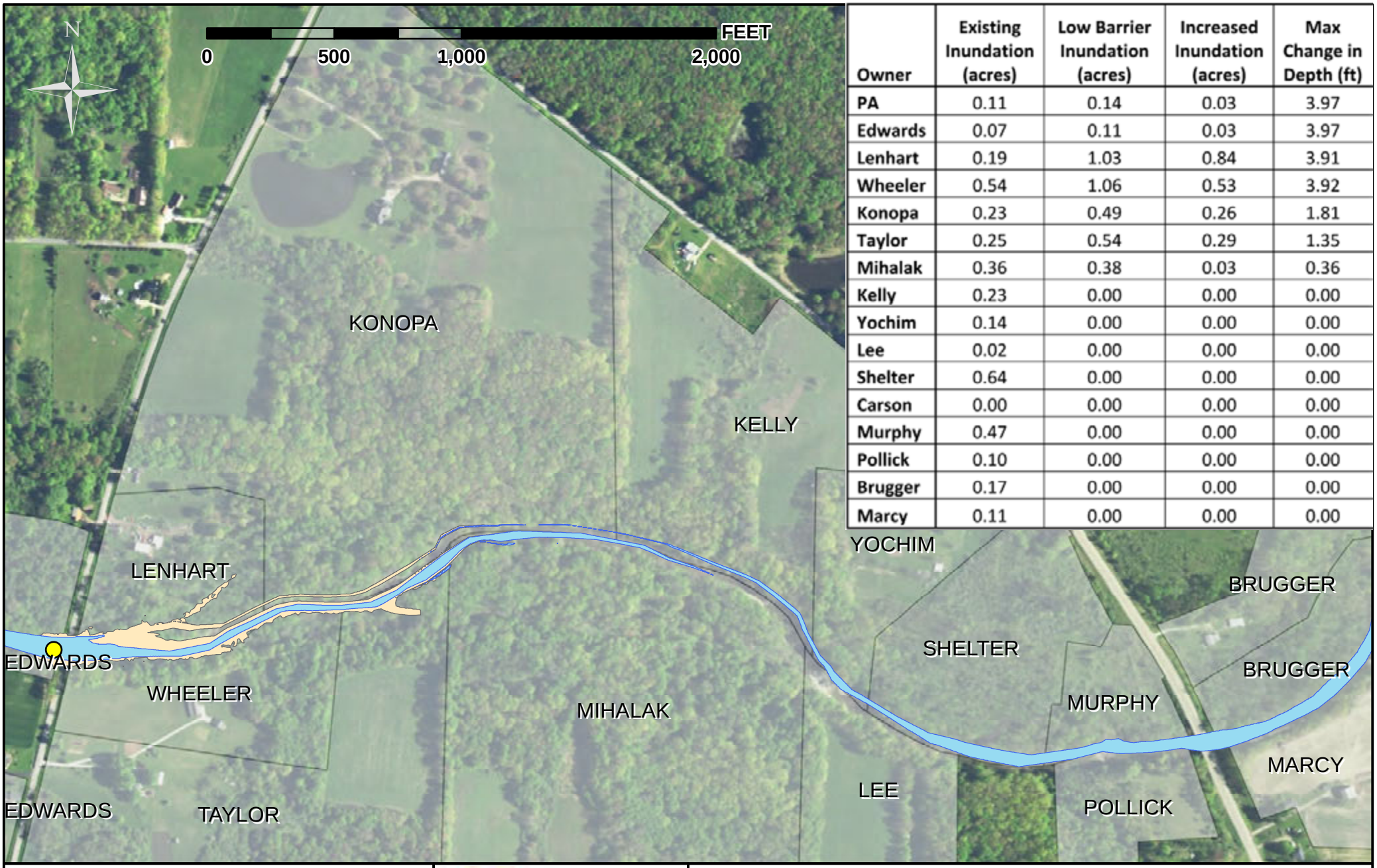
Permanent Inundation Associated with Conneaut Creek Sea Lamprey Barrier Heights

Conneaut Sea Lamprey Barrier
Erie County, Pennsylvania



Owner	Existing Inundation (acres)	Low Barrier Inundation (acres)	Increased Inundation (acres)	Max Change in Depth (ft)
PA	0.11	0.14	0.03	3.97
Edwards	0.07	0.11	0.03	3.97
Lenhart	0.19	1.03	0.84	3.91
Wheeler	0.54	1.06	0.53	3.92
Konopa	0.23	0.49	0.26	1.81
Taylor	0.25	0.54	0.29	1.35
Mihalak	0.36	0.38	0.03	0.36
Kelly	0.23	0.00	0.00	0.00
Yochim	0.14	0.00	0.00	0.00
Lee	0.02	0.00	0.00	0.00
Shelter	0.64	0.00	0.00	0.00
Carson	0.00	0.00	0.00	0.00
Murphy	0.47	0.00	0.00	0.00
Pollick	0.10	0.00	0.00	0.00
Brugger	0.17	0.00	0.00	0.00
Marcy	0.11	0.00	0.00	0.00

Legend

- Griffey Road Barrier
- Conneaut Creek Parcels
- Existing Conditions
- Low Barrier Height

US Army Corps of Engineers
Buffalo District

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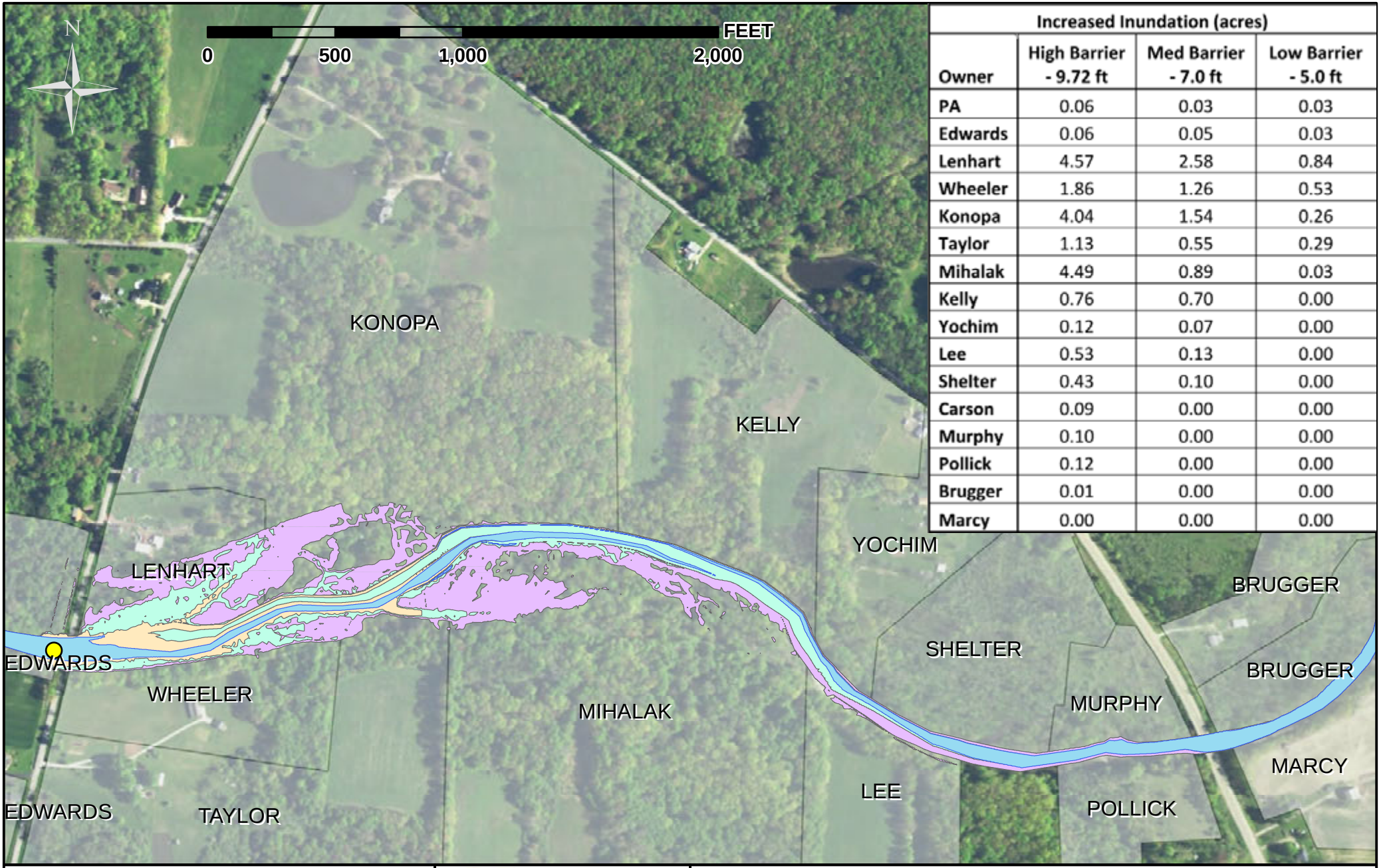
Permanent Inundation Associated with Conneaut Creek Sea Lamprey Barrier Heights

Conneaut Sea Lamprey Barrier
Erie County, Pennsylvania



Increased Inundation (acres)			
Owner	High Barrier - 9.72 ft	Med Barrier - 7.0 ft	Low Barrier - 5.0 ft
PA	0.06	0.03	0.03
Edwards	0.06	0.05	0.03
Lenhart	4.57	2.58	0.84
Wheeler	1.86	1.26	0.53
Konopa	4.04	1.54	0.26
Taylor	1.13	0.55	0.29
Mihalak	4.49	0.89	0.03
Kelly	0.76	0.70	0.00
Yochim	0.12	0.07	0.00
Lee	0.53	0.13	0.00
Shelter	0.43	0.10	0.00
Carson	0.09	0.00	0.00
Murphy	0.10	0.00	0.00
Pollick	0.12	0.00	0.00
Brugger	0.01	0.00	0.00
Marcy	0.00	0.00	0.00

Legend

- Griffey Road Barrier
- Conneaut Creek Parcels
- Existing Conditions
- Low Barrier Height
- Medium Barrier Height
- High Barrier Height

US Army Corps of Engineers
Buffalo District

Document Name: Real_Estate_Figsmxd.mxd
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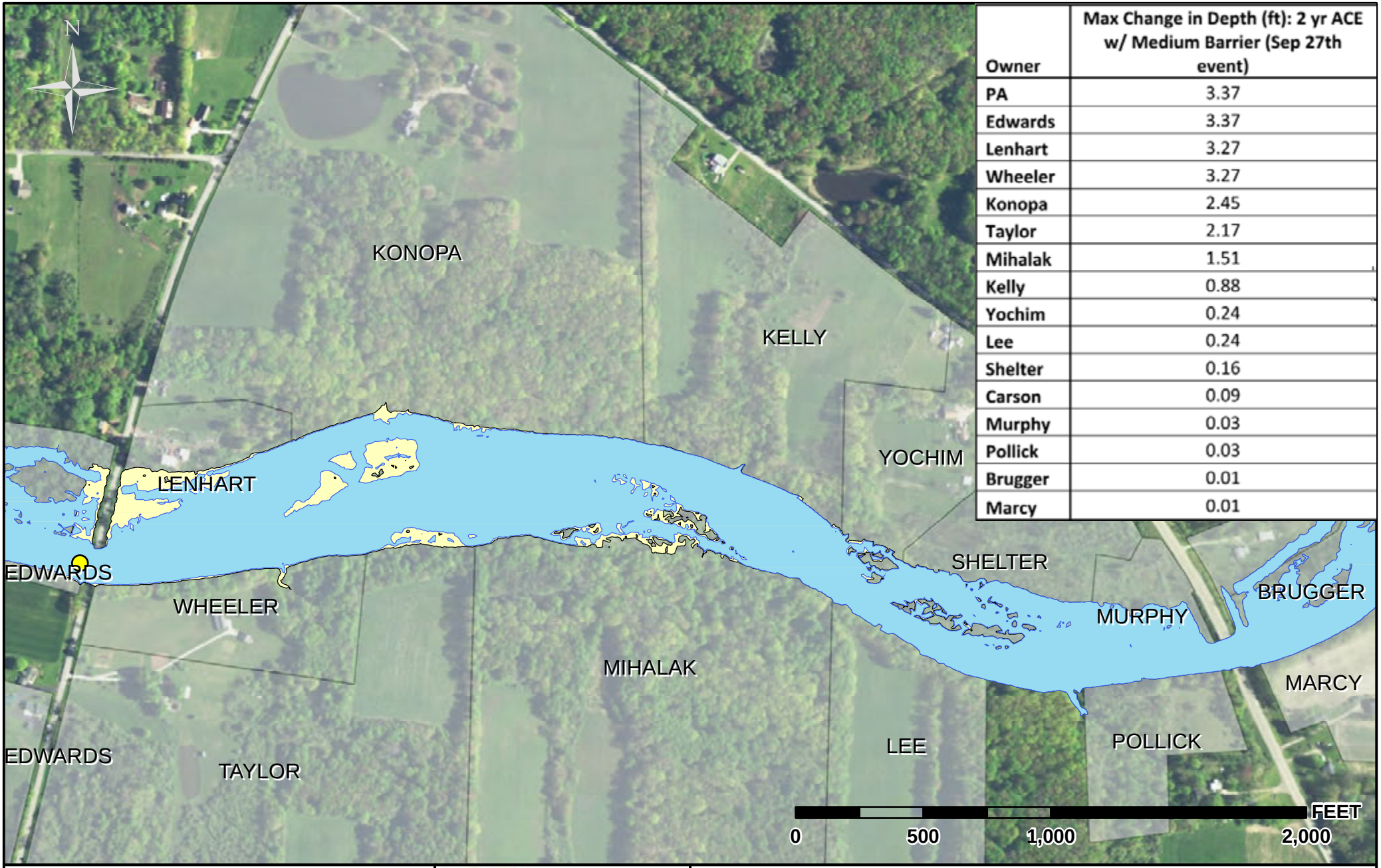
Permanent Inundation Associated with Conneaut Creek Sea Lamprey Barrier Heights

Conneaut Sea Lamprey Barrier
Erie County, Pennsylvania



Owner	Max Change in Depth (ft): 2 yr ACE w/ Medium Barrier (Sep 27th event)
PA	3.37
Edwards	3.37
Lenhart	3.27
Wheeler	3.27
Konopa	2.45
Taylor	2.17
Mihalak	1.51
Kelly	0.88
Yochim	0.24
Lee	0.24
Shelter	0.16
Carson	0.09
Murphy	0.03
Pollick	0.03
Brugger	0.01
Marcy	0.01

Legend

- Griffey Road Barrier
- Conneaut Creek Parcels
- Existing Conditions
- Medium Barrier Inundation

US Army Corps of Engineers
Buffalo District

Document Name: Real_Estate_Figsmxd.mxd
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2 Year ACE Event Inundation with Medium Sea Lamprey Barrier Height

Conneaut Sea Lamprey Barrier
Erie County, Pennsylvania

RIGHT OF ENTRY & INVESTIGATIONS (USACE)

- The Right of Entry is for survey and investigations ONLY, the government CANNOT use this Right of Entry to construct ANYTHING on your property.

- The Right of Entry is valid through December 31, 2023; this is to ensure the U.S. Army Corps of Engineers (USACE) can return through the end of the year in case a need for additional data arises.

- USACE is NOT authorized to financially compensate landowners in exchange for signing a Right of Entry.

- All equipment used to complete surveys on your property can be carried in by foot by the survey team, no heavy equipment required.

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REAL ESTATE PROCESS

- If it is determined that your property would be impacted once we have determined a barrier location, you will be contacted by a member of the Real Estate team.

- Our project partners, the Great Lakes Fishery Commission, has indicated they have no intention of utilizing eminent domain (otherwise known as condemnation) to complete this project.

- If you wish to be part of the project, then the government will send a licensed appraisal to your property. The impacted land you own will be appraised and we will offer you fair market value for the property. The federal government CANNOT legally offer you LESS than fair market value for your property.

- While it is not known what Real Estate instruments would be used to acquire the property at this time, the government would most likely be looking to acquire the property needed to complete the project with some type of permanent easement.

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PROJECT SCHEDULE (FEASIBILITY, DESIGN, AND CONSTRUCTION) - USACE

Completed Federal Interest Determination	June 2021
Executed Feasibility Cost Share Agreement	October 2021
Received Federal and Non-Federal Funds	October 2021
Investigations & Formulate Alternatives	October 2021-December 2022
Tentatively Selected Plan	January 2023
Agency & Public Review	February 2023-September 2023
Final Report Phase - Detailed Project Report	October 2023-February 2024
Execute Project Partnership Agreement	March-April 2024
Detailed Design Report & Plans and Specifications	May 2024-January 2025
Contract Award	March-April 2025
Start Construction	June 2025
Complete Construction	October 2025
Project Closeout	February 2026
Operations & Maintenance	Partner Agency

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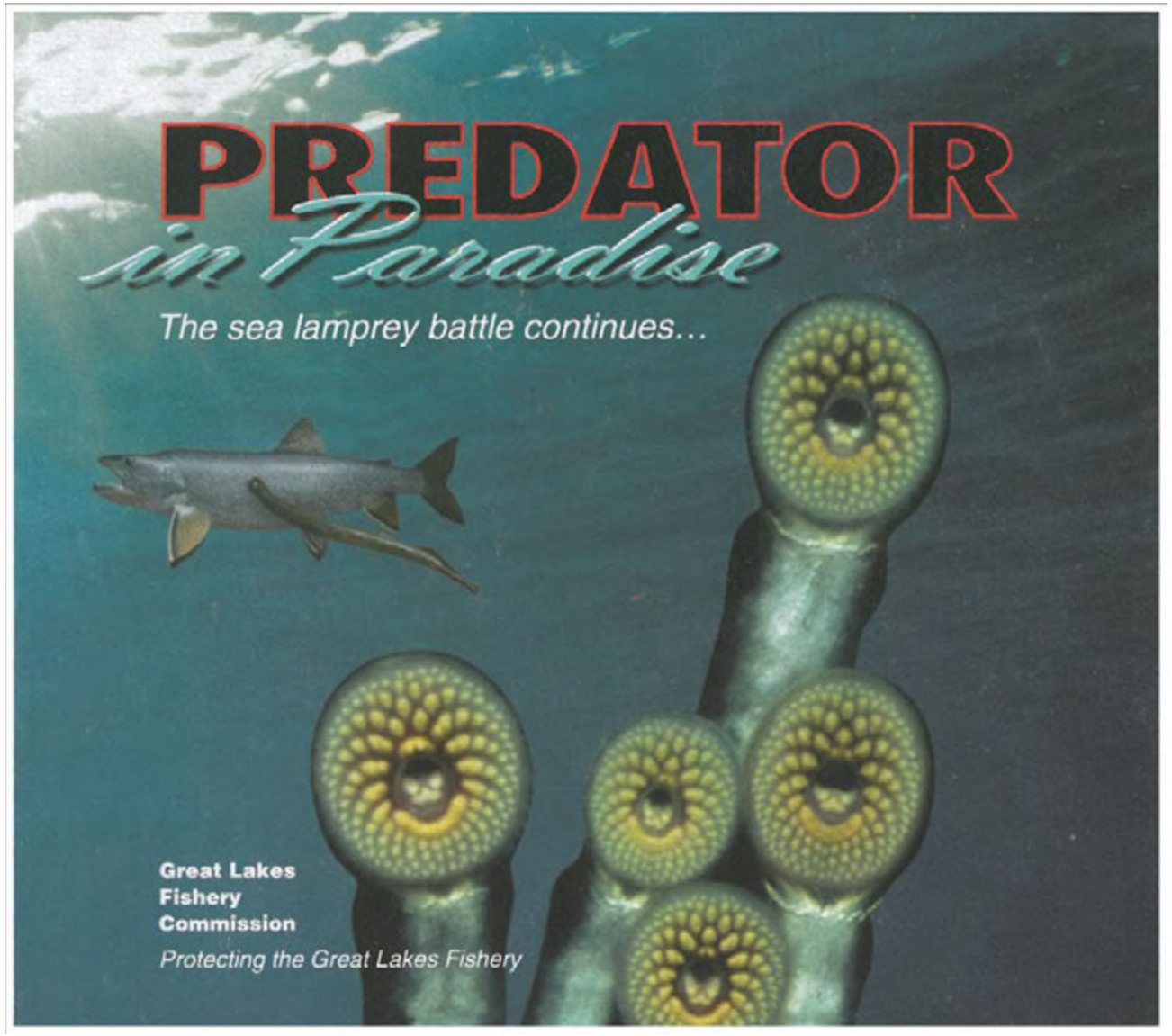
QUESTIONS/COMMENTS



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Conneaut Creek Fishery and Ecosystem Restoration Sea Lamprey Barrier Project

Landowners Meeting Sign-In Sheet

Wednesday, November 9, 2022

Name	Phone Number	Email
[redacted]	[redacted]	[redacted]

Project partners: US Army Corps of Engineers Buffalo District; pennsylvania FISH AND BOAT COMMISSION; pennsylvania; Sea Grant Pennsylvania

Conneaut Creek Fishery and Ecosystem Restoration Sea Lamprey Barrier Project

Landowners Meeting Questionnaire

Wednesday, November 9, 2022

Name: [redacted] ail: [redacted]

ddress: [redacted] Dunkley Rd [redacted]

1. Considering the project information provided regarding potential sea lamprey barrier locations, barrier types, associated increased inundation, and, environmental benefits and impacts, is this project potentially acceptable to you as a property owner on Conneaut Creek?

   Please circle one: (YES) NO MAYBE

2. If you answered "NO" to question 1, do you prefer to see continued sea lamprey control via chemical lampricide treatments?

   Please circle one: YES (NO) MAYBE

3. Do you have additional comments or concerns regarding the placement of a sea lamprey barrier in the vicinity of your property?

Please mail to: **Lex Barker, 1776 Niagara Street, Buffalo, NY 14207**

Or email answers to: **conneautcreekglfer@usace.army.mil**

Project partners: US Army Corps of Engineers Buffalo District; pennsylvania Fish and Boat Commission; pennsylvania Department of Environmental Protection; Sea Grant Pennsylvania

Conneaut Creek Fishery and Ecosystem Restoration Sea Lamprey Barrier Project

Landowners Meeting Questionnaire

Wednesday, November 9, 2022

Name: [redacted]

Address: [redacted] Griffey Rd.

1. Considering the project information provided regarding potential sea lamprey barrier locations, barrier types, associated increased inundation, and, environmental benefits and impacts, is this project potentially acceptable to you as a property owner on Conneaut Creek?

   Please circle one: **YES** **NO** (**MAYBE**) — most likely

2. If you answered "NO" to question 1, do you prefer to see continued sea lamprey control via chemical lampricide treatments?

   Please circle one: **YES** **NO** **MAYBE**

3. Do you have additional comments or concerns regarding the placement of a sea lamprey barrier in the vicinity of your property?

Please mail to: **Lex Barker, 1776 Niagara Street, Buffalo, NY 14207**

Or email answers to: conneautcreekglfer@usace.army.mil

Project partners: US Army Corps of Engineers Buffalo District; pennsylvania Fish and Boat Commission; pennsylvania; Sea Grant Pennsylvania

Conneaut Creek Fishery and Ecosystem Restoration Sea Lamprey Barrier Project

Landowners Meeting Questionnaire

Wednesday, November 9, 2022

Name: [redacted] Phone: [redacted] Email: [redacted]

Address: [redacted] GRIFFEY, W. SPRINGFIELD, PA 16443

1. Considering the project information provided regarding potential sea lamprey barrier locations, barrier types, associated increased inundation, and, environmental benefits and impacts, is this project potentially acceptable to you as a property owner on Conneaut Creek?

   Please circle one: **YES** (**NO**) **MAYBE**

2. If you answered "NO" to question 1, do you prefer to see continued sea lamprey control via chemical lampricide treatments?

   Please circle one: **YES** (**NO**) **MAYBE**

3. Do you have additional comments or concerns regarding the placement of a sea lamprey barrier in the vicinity of your property?

I NEED TO CHEW ON THIS A WHILE.

Please mail to: **Lex Barker, 1776 Niagara Street, Buffalo, NY 14207**

Or email answers to: **conneautcreekglfer@usace.army.mil**

Project partners: Corps of Engineers Buffalo District; pennsylvania FISH AND BOAT COMMISSION; pennsylvania; Sea Grant Pennsylvania

Pennsylvania State Historic Preservation Office
PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION

March 29, 2024

Sent Via PA-SHARE

RE: ER Project # 2024PR01593.001, Conneaut Creek Great Lakes Fishery and Ecosystem Restoration (GLFER) - Sea Lamprey Barrier, Army Corps of Engineers, Conneaut Township, Erie County

Dear Submitter,

Thank you for submitting information concerning the above referenced project. The Pennsylvania State Historic Preservation Office (PA SHPO) reviews projects in accordance with state and federal laws. Section 106 of the National Historic Preservation Act of 1966, and the implementing regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation, is the primary federal legislation. The Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988) is the primary state legislation. These laws include consideration of the project's potential effects on both historic and archaeological resources.

Above Ground Resources
No Above Ground Concerns - Environmental Review - No Effect - Above Ground

Based on the information received and available within our files, it is our opinion that the proposed project will have No Effect on above ground historic properties, including historic buildings, districts, structures, and/or objects, should they exist. Should the scope of the project change and/or should you be made aware of historic property concerns, you will need to reinitiate consultation with our office using PA-SHARE.

For questions concerning above ground resources, please contact Sara-Ladd Manley at samanley@pa.gov.

Archaeological Resources
No Archaeological Concerns - Environmental Review - No Effect - Archaeological

Based on the information received and available in our files, in our opinion, the proposed project should have No Effect on archaeological resources. Should the scope of the project be amended to include additional ground-disturbing activity and/or should you be made aware of historic property concerns regarding archaeological resources, you will need to reinitiate consultation with our office using PA-SHARE.

For questions concerning archaeological resources, please contact Sara-Ladd Manley at samanley@pa.gov.

Sincerely,

Emma Diehl
Environmental Review Division Manager

CLEAN WATER ACT SECTION 404(b)(1) EVALUATION

SECTION 506 GREAT LAKE FISHERY AND ECOSYSTEM RESTORATION
CONNEAUT CREEK
ERIE COUNTY, PENNSYLVANIA

1. PROJECT DESCRIPTION

1.1 Location. Conneaut Creek originates in northwestern Pennsylvania and flows north for approximately 35 miles where it then turns west for 26 miles. After crossing the Ohio – Pennsylvania border, the creek turns east-northeast flowing for 13 miles before it drains into Lake Erie. The entire drainage basin for Conneaut Creek is 190.7 square miles (mi^2). Figure 1 illustrates the extent of the Conneaut Creek watershed in Ohio and Pennsylvania. The study area for this project is the mainstem of Conneaut Creek in Pennsylvania between the Ohio-Pennsylvania border at river mile (RM) 24.5 and the confluence of the East Branch of Conneaut Creek at RM 38.5. The proposed sea lamprey barrier project is in Conneaut Creek near Griffey Road in Erie County, Pennsylvania.

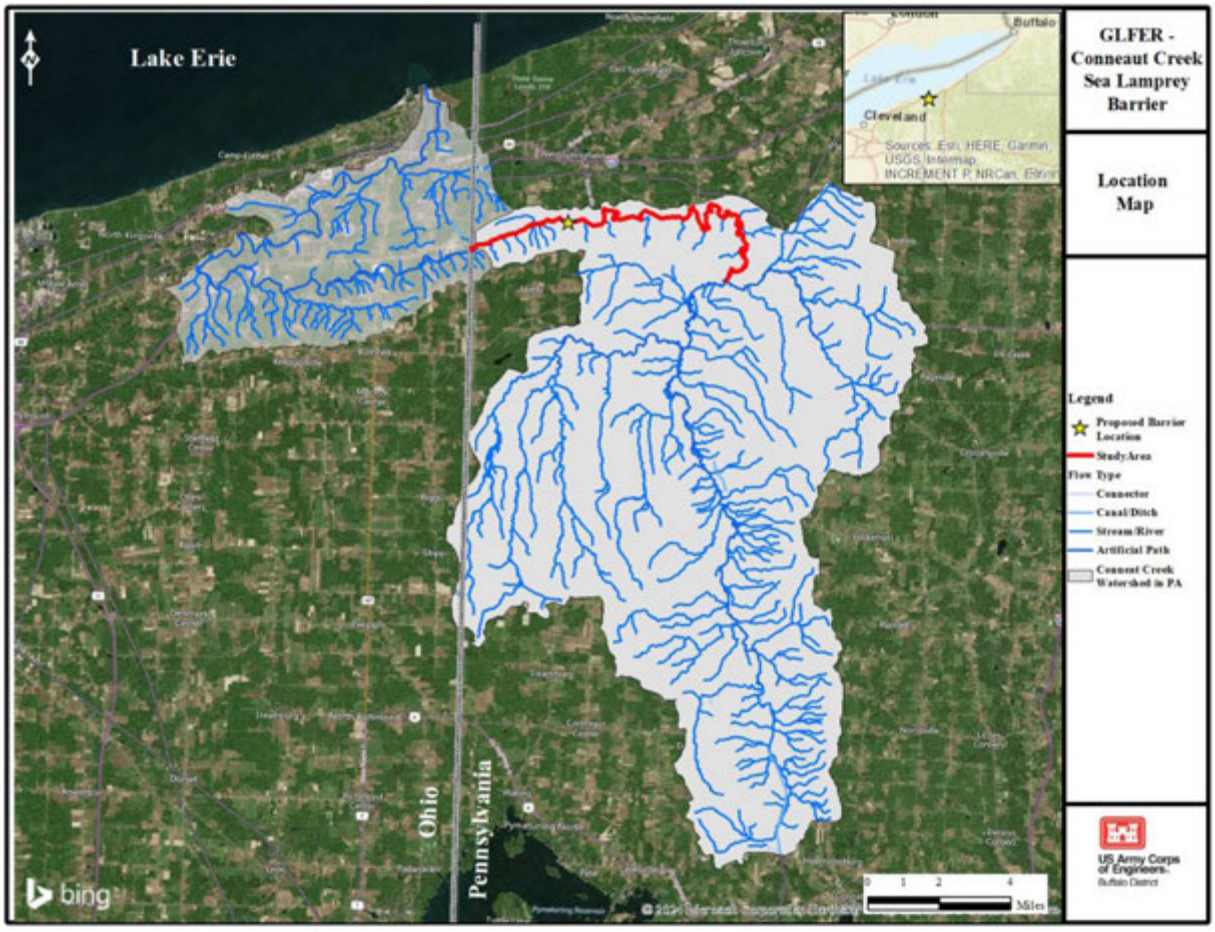

Figure 1: Conneaut Creek watershed located in northeastern Pennsylvania and northwestern Ohio

1.2 General Description. The sea lamprey (*Petromyzon marinus*) is a primitive, eel-like fish that originally entered the Great Lakes from the Atlantic Ocean. Mature adults migrate into streams to spawn from early March through July in various parts of the Great Lakes basin, and the larvae that develop from the eggs take up residence in stream bottoms feeding on organic debris and algae in the stream until they transform to their parasitic form and return to the lakes 3 to 10 years later. Upon returning to the lakes, they attach to large fish such as salmon and lake trout using their suction-cup like mouths to feed on them as parasites. During their parasitic phase, which lasts 12 to 18 months, it is estimated that each lamprey kills approximately 40 pounds of fish. The mortality caused by the sea lamprey, combined with intense fishing pressure and spawning habitat destruction, has resulted in the decline of many native fish species in the Great Lakes.

Since 1954, the Great Lakes Fishery Commission (GLFC) has been implementing a comprehensive sea lamprey control program to reduce impacts of the invasive sea lamprey population on native fish stocks in the Great Lakes. Current sea lamprey control methods depend heavily on the use of chemical lampricides, and lampricide is applied in Conneaut Creek every two to five years to eliminate or reduce larval sea lamprey populations. Significant cost as well as public and ecological concern are associated with continued and repeated use of lampricide. As such, the GLFC has committed to reduce lampricide application through the implementation of alternative lamprey control strategies, including the use of barriers to block sea lamprey migration into spawning areas.

This study evaluates the feasibility of implementing a permanent sea lamprey control alternative in Conneaut Creek, Pennsylvania. The objectives of this study are to provide the sponsor, the GLFC, with a more efficient and effective means to prevent or significantly reduce the numbers of sea lamprey from reaching approximately 50 river miles of spawning habitat in Conneaut Creek, reduce the need to use lampricide in Conneaut Creek, and to maintain or improve the stream habitat quality for desirable fish species. Over the course of this study, seven alternatives were formulated and screened down to a focused array of five alternatives. The focused array of alternatives included the no-action alternative as well as four types of barriers with accompanying fish passage and recreational mitigation structures that include a high fixed crest barrier, an electric barrier, a low fixed crest and electric barrier, and a low adjustable crest and electric barrier.

The Recommended Plan and National Ecosystem Restoration (NER) Plan, Alternative 4a, consists of a seasonally operated adjustable low crest barrier that uses an Obermeyer gate and electrical barrier with trap and sort and jumping pool at Griffey Road. Alternative 4a provides a more efficient and effective means to prevent or significantly reduce the numbers of sea lamprey reaching spawning habitat in Conneaut Creek while minimizing environmental impacts and inundation on adjacent properties. Pending additional engineering evaluations conducted in the design phase and Pennsylvania Department of Transportation approval, the barrier would tie into the existing Griffey Road bridge abutment and embankment on the right bank. The existing bridge abutment and embankment, along with the low crest barrier, will serve to impound water to achieve a difference in upstream and downstream water levels.

The adjustable crest barrier will be approximately five feet in height above the current creek bed and approximately 110 feet wide, excluding the abutments at each bank. During the design phase, the design team will consider the best location for the electric barrier, measures to prevent fish mortality under the adjustable crest barrier, and bracing details for the adjustable crest to ensure the barrier functions as intended. To accommodate fish passage, the Recommended Plan includes a trap and sort system to trap fish and remove lamprey and a jumping pool. Additional measures including a slotted fishway will be considered during the design phase. To accommodate recreational use of Conneaut Creek and ensure public safety, the Recommended Plan includes a portage that will allow boaters to pull out of the water upstream of the barrier, safely cross Griffey Road, and return to the creek downstream of the barrier. Overall, Alternative 4a provides an estimated 160 average annual habitat units (AAHUs) by limiting sea lamprey migration into Conneaut Creek and reducing the need for lampricide applications upstream of the barrier.

1.3 Authority and Purpose. The proposed project is authorized under Section 506 of the Water Resources Development Act (WRDA, as amended by Section 5011 WRDA 2007, authorizes the USACE to develop a plan for activities that support the management of Great Lakes fisheries in cooperation with the signatories to the Joint Strategic Plan for Management of the Great Lakes Fisheries and other affected interests. This plan is referred to as the "Support Plan" and it provides guidance for the planning, design, construction, and evaluation of projects to restore the fishery, ecosystem, and beneficial uses of the Great Lakes in cooperation with other federal, state, and local agencies and the Great Lakes Fishery Commission.

Costs for the planning, design, construction, and evaluation of restoration projects are cost-shared 65 percent federal and 35 percent non-federal. Non-federal interests may contribute up to 100 percent of their share for projects in the form of lands, easements, right of ways, relocations and soil borrow and disposal areas, plus other materials, supplies, or work in-kind contributions. Non-federal interests will receive credit for lands, easements, rights–of –way, relocations, and any dredged material disposal areas needed for project construction and must be responsible for the operation, maintenance, repair, rehabilitation, and replacement of projects. Non-federal interests may include private and non-profit entities. The non-Federal sponsor for this project is the Great Lakes Fishery Commission (GLFC).

1.4 General Description of Fill Materials.

1.4.1 *General Characteristics of Material*. The primary materials that would be required to construct the proposed project would be concrete for the foundation of the barrier, right and left bank abutment walls. Clean gravel and granular fill will be used for the access road and backfill of the right bank abutment wall. Jersey barriers and sand bags will be used to control water flow during diversions under low flow conditions in order to contruct half of the barrier in the dry at a time.

1.4.2 *Quantity of Material*. Materials that would be needed for construction include excavating 290 cubic yards of gravel and shale and placing 290 cubic yards of concrete to construct the barrier and foundation for Obermeyer gates, excavating 190 cubic yards of granular material and

soil and then placement of 70 cubic yards of concrete and 190 cubic yards of granular backfill material to construct the right bank abutment wall. Excavating 10 cubic yards of loose material along the bank face, placement of 40 cubic yards of concrete and backfill 10 cubic yards of concrete against the face as part of the new abutment concrete.

1.4.3 *Source of Material*. Construction materials would be obtained from existing commercial sources.

1.5 Description of the Proposed Discharge Site.

1.5.1 *Location*. With the exception of the temporary coffer dams, all proposed fill material would be placed within Conneaut Creek immediately downstream of the Griffey Road Bridge. The bridge is located at 41.918° N, 80.469° W. Jersey barriers and sandbags that will be used for the diversion of flow will be placed upstream of the barrier location near the Griffey Road Bridge.

1.5.2 *Size*. The in-water portion of the project area is approximately 0.6 acres in size. This includes the area of operation, the limits of upstream and downstream sediment removal, and the area were temporary coffer dams will be placed. Less than 2.0 acres of the adjacent state-owned land will be used for staging and temporary stockpiling of materials. There are freshwater wetlands adjacent to the existing parking area and access path that will be used to stage and temporarily stockpile materials. The wetlands will be avoided.

1.5.3 *Type of Site*. The proposed discharge site for the concrete is unconfined. Temporary cofferdams will be constructed using jersey barrier, plastic sheeting, and sandbags to allow for construction activities to be accomplished in the dry.

1.5.4 *Type of Habitat*. Conneaut Creek lies within a relatively narrow and steep valley cutting through layers of shale that define the valley walls. The upper reaches of the river exhibit a shallower gradient and wider floodplain than lower reaches, where at about river mile 28 the gradient of the creek becomes steeper and the valley well defined. Exposed shale bedrock can be observed in many areas of the creek, particularly downstream of river mile 28, with well-defined pool-riffle structure and excellent floodplain access. Observations made of the floodplain and the riparian zone revealed diverse vegetation with floodplain benches and wetlands transitioning from willows, grasses, and shrubs to mature deciduous forest. Preliminary bed sampling identified large, channery-like, cobble sized stones and sandy pools in addition to the exposed bedrock channel bottom. In general, observations moving further upstream favored a slight reduction in stream quality as the stream gradient decreased, with less in-stream structure, a more uniform bed material, and less evident floodplain connections.

1.5.5 *Timing and Duration of Discharge*. Construction of the proposed project would be scheduled to commence in late spring/early summer of 2025 and should be completed within approximately six months. The construction of the cofferdams dams and diversion would occur during this low water time period to avoid impacts to fisheries. The area downstream of the bridge would then be dewatered and excavation of sediment and construction of the new lamprey barrier and wingwalls will occur in the dry. Any dam breaching or barrier bypass work will not commence until adult lamprey are no longer migrating through or in the proximity to the project

area. Application will be made for an exception from any work restriction period in order to allow removal of the cofferdams and rewatering of the new barrier/fish passage structure. This will enable completion of the project within one construction season

1.6 Description of Discharge Method. Construction of the proposed project would include the temporary use of heavy equipment. The lamprey barrier will be constructed by first excavating into the bedrock of the channel, then pouring concrete to create the foundation for the Obermeyer gates. Excavation of the two banks will allow for concrete wingwalls to be installed. Temporary cofferdams will be created by using jersey barriers, plastic sheeting, and sandbags. See Appendix A-4 Cost Engineering Appendix for construction sequence, type and quantities of materials.

2. FACTUAL DETERMINATIONS

The construction materials to be used are chemically inert and physically immobile under existing conditions. These characteristics eliminate the possibility of chemical-biological interaction and any testing specified under Section 230.61 is not applicable in this instance.

2.1 Physical Substrate Determinations.

2.1.1 *Substrate Elevation and Slope*. The existing top of bank elevation is approximately 800 feet NAVD 88. The stream bed elevation is approximately 789.0 feet NAVD88. The Obermeyer gate crest height will be 794 feet NAVD 88.

2.1.2 *Sediment Type*. Construction of the proposed project would result in replacement of a small portion of the existing riverbed with the base of the concrete barrier foundation. The rest of the area will remain natural substrate.

2.1.3 *Fill Material Movement*. Implementation of the proposed plan would include removal of approximately 290 cubic yards of gravel and shale from the bottom of Conneaut Creek for the construction of the foundation and base for the Obermeyer gate barrier. Material excavated during construction will be disposed of offsite. The actual limits of sediment removal will be based on preconstruction surveys and may vary from that shown in this report due to on-going changes in the creek bottom geometry. The seasonal operation of the barrier will result in the seasonal inundation of approximately 3.8-acre of water upstream which will have minor impacts to sediment transport as it will trap sediment during the 4 months it is operated in the up position and then much if not all of the accumulated sediment will flush down during the 8 months it is lowered. This should greatly reduce the permanent impacts to the sediment transport resulting in higher overall net benefits associated with the protection of over 513 acres of stream habitat upstream of the barrier.

2.1.4 *Physical Effects on Benthos*. During construction there will be a loss of benthic habitat in the footprint of the structure. There will also be localized destruction of some immobile and sedentary benthic organisms that reside in the bottom sediments. Post construction, there will be recolonization of the face of the structure itself which will help to offset impacts. There will be a minor detrimental impact within the 3.8-acre seasonal inundation area with the community

changing from a lotic environment to a lentic environment during the barrier operation months and then when the barrier is lowered again after the sea lamprey run much of the newly deposited sediment will be eroded back to original levels. This periodic disturbance will likely cause a change in the benthos community from its current state.

2.1.5 *Other Effects*. None expected.

2.1.6 *Actions Taken to Minimize Impacts*. The contractor would be required to restrict the construction activities within the boundaries of the proposed work area and minimize the spillage of materials outside of the work area. The area in the vicinity of the proposed barrier location approximately 125 feet downstream of Griffey Road Bridge will be temporarily dewatered to allow of the majority of construction activities to be completed in the dry. Any in-water work would be performed during low-flow periods to minimize any impacts to water quality and/or circulation.

2.2 Water Circulation and Salinity Determinations.

2.2.1 *Water*:

a. Salinity - Not applicable.

b. Water Chemistry - No significant effect.

c. Clarity – Construction activities would result in a short-term increase in turbidity over a relatively small area. Lowering of the barrier each summer will also result in short term increase in turbidity as sediment that has accumulated behind the barrier is released and moved downstream by natural processes.

d. Color - Water color at the project site would be temporarily altered during construction activities and seasonal barrier lowering as a result of increased turbidity.

e. Odor - No significant effect.

f. Taste - No significant effect.

g. Dissolved Gas Levels – During the seasonal operation period of the barrier there is a chance during low flow periods later in the season and when the weather is warmer that dissolved oxygen (DO) levels could drop in the inundation area.

h. Nutrients - No effect.

i. Eutrophication - No effect.

2.2.2 *Current Patterns and Circulation*:

a. Current Pattern and Flow – During construction activities, in-stream flow would be diverted to allow for implementation of in-stream measures and other elements of the proposed project. These diversions would represent temporary alterations of the natural hydrology within

the stream. Following construction, the seasonal operation of the barrier will cause an approximately 3.8 acre impoundment.

b. Velocity – The seasonal barrier will be raised and operated for 4 months out of the year during the sea lamprey run season which is from approximately March 1 -June 30. During this time, a 3.8 acre impoundment will be created slowing down flows and changing the system from a lotic system to a ponded lentic system.

c. Stratification – The barrier crest is only going to be approximately five feet above the stream bottom which greatly reduces the chance of stratification However, Later in the season that the barrier is operating flows will be lower and air temperatures warmer. There may be stratification in the inundation area at this time despite the shallow water depths.

d. Hydrologic Regime – The seasonal barrier will be raised and operated for 4 months out of the year during the sea lamprey run season which is from approximately March 1 -June 30. During this time, a 3.8 acre impoundment will be created slowing down flows and changing the system from a lotic system to a ponded lentic system.

e. Erosion – The seasonal operation of the barrier will result in aggradation of sediment upstream of the barrier within the 3.8 acre inundation area and then when the barrier is lowered in the mid-summer this accumulated sediment will be transported downstream. Thus, there is likely to be seasonal variation in erosion from current levels, but overall not much and only in the localized area around the barrier.

2.2.3 *Normal Water Level Fluctuations*. During the seasonal operation of the barrier, there will be an increase in water depths within the 3.8 acre impoundment area. The barrier will have minimal increase in water level for larger storms and it has been determined that no structures will be impacted by the one percent annual chance exceedance storm event.

2.2.4 *Salinity Gradients*. Not applicable.

2.2.5 *Actions Taken to Minimize Impacts.* The contractor would be required to restrict the construction activities to within the boundaries of the proposed work area and minimize the spillage of materials outside of the work area. The contractor would further be required to minimize accidental spills of fuel, oil, and/or grease, and take appropriate actions in the event of a release. No construction equipment would be permitted to enter the water prior to being steam-washed to remove any oil, grease, or other soils or contaminants from the vehicle. Any in-water work would be performed during low-flow periods to minimize any impacts to fisheries, water quality and/or circulation. These precautions will be required to be outlined by the contractor in an environmental protection plan approved by USACE.

2.3 Suspended Particulate/Turbidity Determinations.

2.3.1 *Expected Changes in Suspended Particulates and Turbidity in the Vicinity of the Discharge Site*. Project construction is expected to increase local turbidity during the actual work period. However, no violations of state water quality standards are anticipated. Elevated suspended particulate concentration associated with these activities would be greatest in the immediate vicinity of the project site but would dissipate rapidly after completion of the project.

Any turbidity plume that might develop would be influenced by stream discharge and velocity conditions occurring at the time of project construction. Any effect in this regard is expected to be very minor and temporary. Seasonal operation of the barrier will result in increases in increased turbidity when the dam is first lowered and accumulated sediment behind the barrier is released and moved naturally downstream.

2.3.2 *Effects on Chemical and Physical Properties of the Water Column*:

a. Light Penetration - Construction activities and lowering of the seasonal barrier each year and the resultant turbidity increases would temporarily decrease light penetration at the project site and for a short distance downstream.

b. Dissolved Oxygen – During the seasonal operation of the barrier and especially during low flow period and increased air temperatures, there may be DO reductions in areas of the inundation area. This would be localized and dissipated when barrier is lowered.

c. Toxic Metals and Organics - No significant effect.

d. Pathogens - No effect.

e. Aesthetics – The presence of construction equipment would temporarily detract from the aesthetic quality of the area. The re-suspension of fine-grained particles in the water column during construction would result in a short-term reduction of clarity and alteration in the color of the water, although this is expected to be very minor due to the mostly contained nature of this construction area. To further minimize this effect, the selected contractor would be required to implement best management practices and control measures to reduce any construction related impacts. Implementation of the low adjustable crest barrier with electrical barrier would result in a seasonal impoundment of approximately 3.8 acres of areas upstream that currently consists of 0.98 acre of wetland, 2.66 acres of perennial stream (Conneaut Creek) and 0.16 acre of forested riparian uplands. The barrier would be operational during the lamprey spawning season (March 1 -June 30) and then lowered for the remainder of the year. Thus, the seasonal impoundment of water each year would result in a minor detrimental impact for aesthetic values.

2.3.3 *Effects on Biota*:

a. Primary Production and Photosynthesis - Temporary increases in turbidity and suspended solids generated during project construction and seasonal lowering of the barrier may cause minor decreases in primary production and photosynthesis. Some aquatic macrophytes (aquatic plants) may also be directly covered because of construction activities. It is anticipated that the periphyton will recolonize the area relatively soon after construction and the seasonal lowering of the barrier to existing levels.

b. Suspension/Filter Feeders – Excavation of the streambed and the installation of coffer dams, as well as seasonal lowering of barrier, may smother bottom dwelling organisms within the project area. Temporary turbidity may also interfere with their feeding. Use of best management practices to control erosion and sedimentation during construction activities would minimize these temporary impacts during construction.

c. Sight Feeders – Temporary increases in local turbidity levels may induce free-swimming fish species to avoid the project area. These species would return to the sites shortly after completion of the project.

2.3.4 *Actions Taken to Minimize Impacts*. The contractor would be required to restrict the construction activities to within the boundaries of the proposed work area and minimize the spillage of materials outside of the work area. The contractor would further be required to minimize accidental spills of fuel, oil, and/or grease, and take appropriate actions in the event of a release. All disturbed soil areas would be immediately seeded and planted with appropriate native plant species to provide/replace vegetative cover to reduce further. Equipment access and almost all in-stream work would only be allowed during the low water period from summer to fall.

2.4 Contaminant Determinations. The proposed project would incorporate only non-contaminated fill materials and would not introduce, relocate, or increase contaminants in the project area. The contractor would be required to develop and implement an environmental protection plan identifying appropriate measures to avoid, minimize, and respond to accidental spills of fuel petroleum products, oil or lubricants.

2.5 Aquatic Ecosystems and Organisms Determinations.

2.5.1 *Effects on Plankton*. Only minor short-term adverse impacts would be expected to affect plankton due to limited, temporary increases in turbidity and suspended solid levels during project construction and seasonal lowering of the barrier.

2.5.2 *Effects on Benthos*. During construction, there will be a loss of benthic habitat in the footprint of the structure. There will also be localized destruction of some immobile and sedentary benthic organisms that reside in the bottom sediments. There will be recolonization of the face of the structure itself which will help to offset impacts. There will be a minor detrimental impact within the 3.8-acre seasonal inundation area with the community changing from a lotic environment to a lentic environment during barrier operation . When the barrier is lowered again after the sea lamprey run much of the newly deposited sediment will be eroded back to original levels. This periodic disturbance will likely cause a change in the benthos community from its current state.

2.5.3 *Effects on Nekton*. Free-swimming aquatic organisms would temporarily avoid the project area during the construction period. Proper construction and installation techniques would be used.

2.5.4 *Effects on Aquatic Food Web*. Only minor, temporary effects on the aquatic food web are expected at the project site, primarily due to the mortality of benthic organisms. Other effects would reflect the mortalities of plankton and nekton from physical impacts. Rapid recolonization of the project site is anticipated.

2.5.5 *Effects on Special Aquatic Sites*:

a. Sanctuaries and Refuges - Not applicable.

b. Wetlands – During construction, there will be a permanent loss of 0.03 acre of wetlands for site access and construction of the support facilities for the electric barrier and earthen berms on both sides of the creek. However, the 3.8-acre seasonal inundation area upstream of the low adjustable crest barrier is likely to permanently convert some of the existing 0.98 acre of forested scrub-shrub wetlands and forested riparian corridor within this area to open water or from forested/scrub shrub areas to emergent vegetated areas resulting in a minor detrimental impact. The increase in hydrology in the inundation area will also convert adjacent areas that are currently upland to wetlands, compensating for the conversion of some of the existing wetlands to open water and thereby creating or restoring wetlands and mitigating the impacts to existing wetlands. This periodic disturbance will likely cause a change in the vegetation from its current composition, but less of a change than those anticipated with Alternative 3a. This conversion of adjacent upland areas to wetlands coupled with the benefits of the overall project offset the minor detrimental impacts to the functions and values of the wetlands impacted and, in this case, have the greatest number of net benefits of any alternative.

c. Mud Flats - Not applicable.

d. Vegetated Shallows - Not applicable.

e. Coral Reefs - Not applicable.

f. Riffle and Pool Complexes –
The proposed project will seasonal create a 3.8-acre inundation area that will temporarily impact the riffle-pool complex upstream of the barrier. These will be restored when the barrier is lowered in the summer each year.

g. Significant Coastal Fish and Wildlife Habitats – Not applicable.

2.5.6 *Threatened and Endangered Species*. Consultation with the USFWS relative to the possible presence of T&E species or their critical habitats within the affected area was initiated on July 22, 2022. The USFWS Information for Planning and Consultation (IpaC) system was reviewed which indicated that there are three federally listed T&E and one proposed species whose range occurs near the project area. Concurrence is still pending from the USFWS with the USACE "no effect" determination for the red knot and determination of "may affect but is not likely to adversely affect" for the northern long-eared bat and Indiana bat. The tricolored bat is not currently listed but likely will before the project goes to construction. Based on the information provided on the USFWS website, this species may use a wide range of habit. It is currently anticipated that similar tree cutting dates as required for Indiana bat and northern long eared bat will apply to this species. The salamander mussel is also not currently listed but likely will before the project goes to construction. The USFWS is also proposing critical habitat for this species and the proposed project location at Griffey Road is within the 62 river miles of Conneaut Creek currently proposed as critical habitat. Detailed surveys conducted by PADEP and PADCNR have not identified salamander mussels within the reach of stream near Griffey Road. This proposed project would reduce or eliminate the application of lampricide over approximately 50 miles of stream upstream of Griffey Road with much of that being within this

proposed critical habitat for salamander mussels. Thus, despite this project potentially impacting some of the proposed critical habitat during construction and seasonal inundation, the project would protect a much larger portion of this critical habitat from lampricide application. Coordination with USFWS and state and local agencies with regards to this issue is on-going.

2.5.7 *Other Wildlife*. Disruption and disturbance by equipment during construction activities would result in a short-term avoidance of the project area by local wildlife species. No significant wildlife habitat is expected to be impacted as these species will begin reusing the area soon after construction is completed.

2.5.8 *Actions Taken to Minimize Impacts.* As a standard practice, the contractor would be required to keep their activities under surveillance, management and control to minimize interference with, disturbance to and damage of local fish and wildlife. The contractor would be required to restrict the construction activities to within the boundaries of the proposed work area, and minimize the spillage of materials outside of the work area. All disturbed soil areas would be immediately seeded with appropriate native grass species to provide/replace vegetative cover to reduce further erosion. Equipment access and in-stream work would only occur during low flow periods from mid-summer to the fall. Siltation associated with this project is expected to be minimal with full sediment dissipation occurring within several hundred feet of the dam.

2.6 Proposed Discharge Site Determinations.

2.6.1 *Mixing Zone Determination*. Since the construction material would consist of inert stone fill and concrete, a mixing zone determination would not be applicable for this project.

2.6.2 *Determination of Compliance with Applicable Water Quality Standards*. The proposed discharge would be in compliance with the State of Pennsylvania's Regulations for Surface Waters and Groundwaters (25 PA Code 93.6) in that it would not introduce harmful or toxic conditions or substances. Section 401 Water Quality Certification, or waiver thereof, will be granted pending PADEPs favorable review of this project.

2.6.3 *Potential Effects on Human Use Characteristics*:

a. Municipal and Private Water Supply – No effect.

b. Recreational and Commercial Fisheries – The proposed project would improve aquatic habitat and benefit recreational fishery by restoring connectivity between the upstream and downstream portions of the watershed and increased opportunities for spawning.

c. Water-Related Recreation – Water-related recreational opportunities would be temporarily impeded and/or unavailable in the proposed project area during construction activities.

d. Aesthetics - The presence of construction equipment and its associated work areas would temporarily detract from the local aesthetic qualities of the project area. Construction activities would temporarily increase turbidity in the river, thereby detracting from the appearance of the area. The presence of a seasonal barrier may detract from the local aesthetic qualities and to other the inundation area will enhance the local aesthetic qualities at least

seasonally.

e. Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves – Due to the project location and type, it is USACE's determination that no historic properties or cultural resources in or adjacent to the area of potential effect would be affected by project construction. An effects determination will be submitted to PA SHPO and THPOs for each of the federally recognized tribes for confirmation of this determination.

2.7 Determination of Cumulative Effects on the Aquatic Ecosystem. Cumulative effects are defined as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR §1508.7). The incremental effects from the preferred plan are ecologically beneficial and would improve the sustainability of aquatic and biological resources. The proposed project may also potentially result in the expansion of fishing access to upstream areas.

2.8 Determination of Secondary Effects on the Aquatic Ecosystem. No significant adverse secondary effects on the aquatic ecosystem would be expected to occur as a result of the project.

3.0 PUBLIC COORDINATION

This Evaluation will be finalized following consideration of all applicable comments from the Clean Water Act Section 404(b) Public Notice comment period.

FINDING OF COMPLIANCE

SECTION 506 GREAT LAKE FISHERY AND ECOSYSTEM RESTORATION
CONNEAUT CREEK SEA LAMPREY BARRIER
ERIE COUNTY, PENNSYLVANIA

1. No significant adaptations of the Section 404(b)(1) guidelines were made relative to this evaluation.

2. Alternative plans were evaluated that would effectively limit sea lamprey migration into Conneaut Creek thereby reducing or eliminating the need for lampricide treatments. In addition to a "no action" plan, four other alternatives were evaluated. These consisted of an electric only barrier, a high fixed crest barrier, a low fixed crest, and a low adjustable crest (Obermeyer). The Recommended Plan (Alternative 4a) is the National Ecosystem Restoration (NER) plan, which includes:

> A seasonally operated adjustable low crest barrier that uses an Obermeyer gate and electrical barrier with trap and sort and jumping pool at Griffey Road to provide more efficient and effective means to prevent or significantly reduce the numbers of sea lamprey from reaching upstream spawning habitat in Conneaut Creek.

3. The planned placement of fill materials at the project site would not violate any applicable state water quality standards. The construction effort would also not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

4. Use of the selected fill sites would not harm any threatened or endangered species or designated critical habitat.

5. The proposed placement of fill material would not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, shellfish, wildlife, or special aquatic sites. The life stages of aquatic life and other wildlife would not be adversely affected. No significant adverse effects on aquatic ecosystem diversity, productivity and stability, or recreational, aesthetic and economic values would occur.

6. Appropriate steps to minimize potential adverse impacts of the discharge on aquatic systems would be taken. During construction, the contractor would be required to minimize turbidity and accidental spills of fuels, oils, and/or greases, and take appropriate actions in the event of a release. All disturbed soil areas would be immediately seeded with appropriate native grass species to provide/replace vegetative cover to reduce further erosion. Equipment access and in-stream work would only occur during low flow periods from mid-summer to the fall.

7. *Placeholder for public comment consideration*.

8. On the basis of the guidelines, the proposed site for the discharge of fill materials is specified as complying with these guidelines.

US Army Corps of Engineers®
Buffalo District

CONNEAUT CREEK SEA LAMPREY BARRIER PROJECT
P2# 495058

Section 506 – Water Resources Development Act of 1992, as amended Great Lakes Fishery and Ecosystem Restoration

Erie County, Pennsylvania

Appendix A-7:
Phase I Environmental Site Assessment

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1.0 EXECUTIVE SUMMARY

1.1 Site Name

Phase I Environmental Site Assessment

Sea Lamprey Barrier for Conneaut Creek
Griffey Road Study Area
West Springfield, Pennsylvania

1.2 Inspection Date

March 9, 2023

1.3 Name of Inspector

Andrew Aufderheide, EIT

1.4 Site Description and General Observations

The United States Army Corps of Engineers, Buffalo District (USACE) is conducting a feasibility study to develop and evaluate alternatives for a sea lamprey barrier in Conneaut Creek. The four alternatives under consideration are an electric barrier, a low crest fixed barrier with a natural bypass, a low crest fish barrier with a slotted fishway, or an Obermeyer gate. The study area, located in West Springfield, Pennsylvania, is being evaluated for implementation of one of these barrier alternatives. The Griffey Road Study Area, the focus of this assessment, is designated within the floodplain of Conneaut Creek bounded between Griffey Road and Route 6N and can be seen in Figure 1.

The purpose of this Phase I Environmental Site Assessment (ESA) is to identify the presence of recognized environmental conditions (RECs) in connection with the study area and proposed alternatives. The focus of the assessment, the study area, is the flood plain and other locations that are likely to be inundated, if a barrier were constructed.

The immediate vicinity surrounding the study area is characterized mainly as rural and agricultural, with minimal development and some wooded areas. The primary developments in the area are roads and residential structures.

1.5 Findings and Conclusions

USACE has performed a Phase I Environmental Site Assessment (ESA) in conformance with the scope and limitations of American Society for Testing and Materials (ASTM) Standard E 1527-21 of the study area properties, located in West Springfield, Pennsylvania. The Executive Summary serves as a summary of this report and presents the significant findings, conclusions, and recommendations. The Executive Summary should not be considered a stand-alone document and must be evaluated in conjunction with the discussions, supporting documentation, and limitations within this ESA report.

This assessment has revealed no evidence of recognized environmental conditions in connection with the study area.

2.0 INTRODUCTION

2.1 Purpose

The purpose of the Phase I Environmental Site Assessment is to evaluate, pursuant to the process described herein, whether or not hazardous substances or petroleum products may be present on the properties under conditions suggesting that a release, past release, or material threat of a release to the properties may have occurred, and to conclude whether or not recognized environmental conditions (RECs) exist based on the results of the process. This assessment is not intended to identify *de minimis* conditions that do not present a significant risk of harm to public health or the environment, and that would generally not be subject to enforcement action if brought to the attention of appropriate governmental agencies.

2.2 Scope of Work

USACE personnel performed the following primary Phase I work:

- Records Review (Federal environmental records, State and Tribal environmental records, EDR proprietary records, aerial photographs, fire insurance maps, city directory abstract and historical topographic maps).
- Site Reconnaissance (site visit, including visual inspection of study area and adjoining properties).
- Interviews with Property Owners

No additional services beyond "appropriate inquiry" as defined by the ASTM Phase I standard were performed during this assessment.

2.3 Standards

USACE personnel followed the practice established by ASTM International, formerly the American Society for Testing and Materials (ASTM), Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (Designation E1527 – 21). This practice defines "good commercial and customary practice in the United States of America for conducting an environmental site assessment of a parcel of commercial real estate with respect to the range of contaminants within the scope of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and petroleum products."

3.0 STUDY AREA DESCRIPTION

3.1 Location

The Griffey Road Study Area consists of several land parcels, with different landowners, in West Springfield, Pennsylvania. West Springfield is located within Erie County in northeastern Pennsylvania near the Ohio/Pennsylvania border and about 24 miles southwest of Erie, Pennsylvania. Conneaut Creek flows westward through Pennsylvania and then ends at Lake Erie in Ohio. Refer to Figure 1 for a map of the study area location.

3.2 Site and Vicinity Characteristics

The study area and vicinity consist of mostly private land, which is minimally developed with roads, residential structures. There is also a parcel of public land on Griffey Road on the north bank of Conneaut Creek. The study area consists of the stretch of Conneaut Creek between Griffey Road and Route 6N along with the floodplain associated with that stretch of the creek. The land within the study area is moderately wooded with other vegetation which is adapted to periodic flooding. Most of the land in the surrounding area is generally either agricultural or residential, with some forested areas also present nearby.

The topography of the study area is mostly flat and gently sloping within the confines of the creek valley. The study area is confined by the sides of the creek valley, which have a steep gradient, that occurs within 700 feet of either side of the creek. The study area has a slight slope down to the west as the creek flows to the west.

3.3 Current Use of the Subject Properties

The study area consists of mostly private land with minimal development. One parcel of land is publicly owned along Griffey Road on the northern shore of Conneaut Creek. The properties that comprise the study area are used primarily for residential purposes, with some agricultural use also present. Developments consist mostly of roads and residential structures, which all sit outside the floodplain that makes up the study area. The majority of the property within the study area is undeveloped, consisting of a moderately wooded forest with other smaller vegetation that surrounds the creek.

3.4 Description of the Site Infrastructure

Study Area-specific information on site infrastructure is presented below.

Structures

Residential buildings are present on the properties around the creek. None of the residential structures are located within the study area or areas of the floodplain likely to be inundated post-construction.

Roads

Griffey Road is paved, active, and traverses the western extent of the study area on a bridge. Route 6N is paved, active, and traverses the eastern extent of the study area on a bridge.

Utilities

Powerlines near the study area are managed by Northwestern Rural Electric Cooperative Association. No powerlines or other utilities are located directly within the study area or areas of the floodplain likely to be inundated post-construction.

3.5 Current Use of Adjoining Properties

The adjoining properties are used for residential and agricultural purposes and include forested areas. Some of the adjoining properties also contain gas wells. Overall, the surrounding properties are relatively undeveloped, and the use of the properties is similar to that of the study area.

3.6 Physical Setting

3.6.1 Topography

Based on a review of the 7.5-minute USGS topographic maps, the area to the north of Conneaut Creek is somewhat level and the area to the south of the creek is somewhat hilly. Within the valley of the creek, the floodplain is very level, and slopes down slightly to the west, with the direction of flow of the creek. The elevation of the creek in the study area is around 803 feet where it crosses under Route 6N and travels down to the west to an elevation of about 793 feet where it crosses under Griffey Road. The elevation of the flood plain ranges from about 793 feet to 810 feet. The floodplain is bound to the north and south by steep gradient slopes, which is interrupted occasionally by tributaries. North of the creek, the elevation quickly ascends to about 850 feet, where it then gradually ascends to a little over 870 feet before gradually descending further to the north towards Lake Erie. South of the creek, the elevation quickly ascends to between 830 and 850 feet. The elevation gradually ascends further to the south, through some small hills, to an elevation around 910 feet, where it appears to level off. The general gradient in the larger region is to the north-northwest. Based on the profile of the topography, groundwater in the region would flow generally in a north-northwestern direction. Within the study area, groundwater would likely flow from the valley slopes toward the creek. The actual flow of the groundwater can be influenced by regional bodies of water, subsurface bedrock and geology, rainfall, hydrogeology, hydrology, soil characteristics, and other factors that are beyond the scope of the study. The velocity of the groundwater is generally impacted by the geologic strata in the area. There is no specific data available for the exact flow of the groundwater.

Near the study area, the major surface water body is Conneaut Creek. The creek does meander, but it generally flows to the west toward the Ohio State border. There are no other major surface water bodies in the area.

3.6.2 Soils/Hydrology

The major soil group around the study area is classified as Sheffield silty loam. The hydrologic group of this soils is D, meaning that the soils have a very slow infiltration rate, a clayey texture, a high water table, or are shallow to an impervious layer. The soils drainage class is considered poorly drained. Soils may have a high saturated zone, a layer of low hydraulic conductivity, or seepage. As a result, the soil meets the requirements for a hydric soil. Depth to bedrock is greater than 60 inches below the surface. The first 60 inches of the soil below the ground is comprised of silty loam with fine grained soils. The permeability of the soil generally decreases with depth, and the pH increases with depth. Deeper soil types in the area tend to be stratified.

3.6.3 Geology

The underlying rock stratigraphic unit for the study area is Paleozoic Era, Devonian System and Upper Devonian Series. The geologic age identification category for this rock is the stratified sequence.

4.0 USER PROVIDED INFORMATION

4.1 Title Records

Griffey Road Study Area Property Ownership Information (* Indicates No Access Granted)

CONN	Parcel ID	Owner	Property Address
Conn28	39025093000500	PA Fish and Boat Commission	8180 Griffey Road, W Springfield, PA 16433
Conn29*	39023092000200	Richard Lenhart	8135 Griffey Road, W Springfield, PA 16443
Conn31*	39023092000100	John / Marcia Konopa	7951 Griffey Road, W Springfield, PA 16443
Conn34	39023092000300	Winton / Debra Kelly	8116 Huntley Road, Albion, PA 16401
Conn35*	39023092000400	William Yochim	8168 Huntley Road, Albion, PA 16401
Conn37*	39023092000401	Henry Shelter	8232 Route 6N, Albion, PA 16401
Conn39*	39023092000500	Owen / Jeanette Murphy	8232 Route 6N, Albion, PA 16401
Conn41*	39023091001300	Joseph / Cheryl Brugger	8353 Route 6N, Albion, PA 16401
Conn40	04002003000400	Frank Pollick	8500 Route 6N, Albion, PA 16401
Conn38	04002003000301	Daniel Carson	13138 W Cherry Hill Rd, Albion, PA 16401
Conn36	04002003000300	Albert / Esther Lee	13206 W Cherry Hill Rd, Albion, PA 16401
Conn33*	4002003000200	Kevin / Renae Mihalak	13210 W Cherry Hill Road, Albion, PA 16401
Conn32*	4002003000100	Suzan Taylor & Lisa Dudenhoefer	8235 Griffey Road, W Springfield, PA 16443
Conn30	4002003000103	Michael Wheeler	8255 Griffey Road, W Springfield, PA 16443
Conn26	4002002000200	Gayle / Chad Edwards	8260 Griffey Road, W Springfield. PA 16443

No title information was provided for this report.

4.2 Specialized Knowledge

During March 2022 and early in the feasibility study process, the USACE conducted a records review and preliminary assessment of potential properties. The objective of this preliminary assessment was to identify RECs that would warrant further consideration within and in the immediate vicinity of the properties being contemplated for the development of alternatives. This screening level assessment was performed mainly through a standard search of federal and state environmental records and available aerial photographic imagery. That study area consisted of a total of 83 properties, including the study area that has been considered for this Phase I ESA. The study has been included in Appendix I.

No other previous Environmental Site Assessments or other site characterization reports or evaluations were provided by the property owners or stakeholders.

4.2.1 Activity and Land Use Limitations

Activity and Land Use Limitations (AULs) are one indication of a past or present release of a hazardous substance or petroleum products. AULs are explicit recognition by a federal, tribal, state, or local regulatory agency that residual levels of hazardous substances or petroleum products may be present on a property, and that unrestricted use of the property may not be acceptable.

No AULs for the study area were identified by the property owners.

4.3 Reasons for Performing Phase I ESA

The purpose of this Phase I ESA is to identify the presence of RECs in connection with the study area and proposed alternatives. The focus of the assessment was the flood plain and other locations that are likely to be inundated if a barrier was constructed.

5.0 RECORDS REVIEW

5.1 Introduction

The following records were researched to assist in identifying potential environmental concerns at the site:

- Federal environmental records
- State and tribal environmental records
- EDR proprietary records
- Aerial photographs
- Fire Insurance Maps
- Historical topographic maps
- PADEP GIS pages
- Google Earth
- Local Street Directories

5.2 Information from Standard Environmental Records

5.2.1 Introduction

Information was also gathered from the files of numerous federal and state environmental regulatory agencies. The records researched are a compilation of information on individuals or businesses that have:

- Complied with notification and/or registration requirements under various federal/state programs
- Been visited by regulatory personnel
- Been cited for violations
- Been investigated by environmental regulatory officials
- Had reported spills or releases of hazardous materials

Environmental records were reviewed to identify possible on-site and off-site sources of hazardous substances and petroleum products.

5.2.2 Summary of Environmental Record Data

The following table summarizes the standard environmental records reviewed as required by ASTM E 1527-13, unless otherwise noted.

Standard Environmental Record Sources	Applicable Search Distance	Site	Adjoining Property	Identified Within ASTM Search Distances
Federal National Priorities List (NPL) site	1.0 mile	0	0	0
Federal Delisted NPL site list	1.0 mile	0	0	0
Federal CERCLIS list	0.5 mile	0	0	0
Federal CERCLIS NFRAP site list	0.5 mile	0	0	0
Federal RCRA CORRACTS facilities list	1.0 mile	0	0	0
Federal RCRA Non-CORRACTS TSD facilities list	0.5 mile	0	0	0
Federal RCRA generators list	0.25 mile	0	0	0
Federal institutional control/engineering control (IC/EC) registries	0.5 mile	0	0	0
Federal ERNS	property only	0	0	0
State and tribal equivalent NPL Sites	1.0 mile	0	0	0
State and tribal-equivalent CERCLIS Sites	0.5 mile	0	0	0
State and tribal landfill and/or solid waste disposal site lists	0.5 mile	0	0	0
State and tribal LUST lists	0.5 mile	0	0	0
State and tribal registered UST/AST lists	0.25 mile	0	0	0
State and Tribal IC/EC	0.5 mile	0	0	0
State and tribal voluntary cleanup sites	0.5 mile	0	0	0
State and tribal Brownfield sites	0.5 mile	0	0	0

Regulatory information reviewed concerning the site, adjoining properties, and the nearest facility in each cardinal direction identified within its respective ASTM search distance is detailed below. The complete list of sites, which includes additional records searches and information, and may identify sites located at greater distances from the site, is presented in Appendix A (Federal and State Database Records). The database also describes the specific type of data presented on the various lists.

5.2.3 Details on the Sites Identified in the Environmental Record Reports

No sites were identified in the environmental records report.

5.2.4 Additional Federal State, Tribal, and Local Environmental Record Sources

In addition to the ASTM E-1527 standard resources, Environmental Data Resources, Inc. (EDR), a national provider of environmental information, maintains its own environmental database records, such as those associated with manufactured gas plants, historical automotive service stations, and historical dry cleaners.

No sites were identified in additional environmental records near the study area.

5.2.5 Orphan Sites

Not all sites or facilities identified can be accurately located in relationship to the study area. These facilities, referred to as "Orphan Sites," are identified in the federal/state records in Appendix A.

No orphan sites near the study area were identified in the review.

5.3 Aerial Photograph Review

To evaluate the previous land uses of the subject area, a series of aerial photographs were reviewed. The aerial photographs provide a progressive overview of parcels pertaining to this assessment. The aerial photographs were found on Google Earth and the aerial photo package ranging from 1938 to 2021.

The following is a review of historical aerial photographs:

- **1938:** Land is largely used for agriculture. Large patches are wooded forests. There are residential structures constructed sparsely. Griffey Road and the bridge that crosses Conneaut Creek are there. Further to the east where Route 6N now crosses Conneaut Creek is out of the extent of the image. (Aerial imagery report)
- **1956:** No major changes. (Aerial imagery report)
- **1959:** No major changes. (Aerial imagery report)
- **1960:** No major changes. (Aerial imagery report)
- **1968:** No major changes. (Aerial imagery report)
- **1977:** Some land seems to have been converted from agricultural use into wooded forest. (Aerial imagery report)
- **1983:** A few more houses present but otherwise no major changes. (Aerial imagery report)
- **1985:** No major changes. (Google Earth)
- **1993:** No major changes. (both)
- **2002:** No major changes. (Aerial imagery report)
- **2004:** The entire study area is now visible. Mostly wooded forest near the creek. More residential structures visible. (Google Earth)
- **2005:** No major changes. (Google Earth)
- **2006:** No major changes. (both)
- **2008:** no major changes. (Google Earth)

- **2009:** no major changes. (Google Earth)
- **2010:** no major changes. (both)
- **2011:** No major changes. (Google Earth)
- **2012:** No major changes. (Google Earth)
- **2013:** No major changes. (both)
- **2014:** No major changes. (Google Earth)
- **2015:** No major changes. (Google Earth)
- **2016:** No major changes. (Google Earth)
- **2017:** No major changes. (both)
- **2019:** No major changes. (Google Earth)
- **2021:** No major changes. (Google Earth)

5.4 Sanborn Map Records

Fire insurance maps (i.e., Sanborn Maps) provide historic information on properties. Fire insurance maps were not available for the study area. A record of the search is provided in Appendix C.

5.5 Historical Topographic Map Review

Historical topographic maps were available for the site. The following historical topographic maps were reviewed: 1900, 1959, 1960, 1969, 1970, 1977, 2013, 2016, and 2019. The following is a review of the historical topographic maps:

- **1900:** Road network is built out and has nearly all the roads that are there today. A few buildings are built along the roads.
- **1959:** Building on what is currently the Lenhart property has been built.
- **1960:** No major changes.
- **1969:** No major changes.
- **1970:** No major changes.
- **1977:** No major changes.
- **2013:** Buildings are no longer displayed.
- **2016:** No major changes.
- **2019:** No major changes.

5.6 City Directory Report Review

City directory records were available from 1992 to 2017 for Griffey Rd, N Akerley Rd, and Colver Rd. The properties listed were mostly residential with two commercial properties. The commercial properties are Harpst Bros Construction and Liquid Meter Co Inc, and they are located more than a half mile away from the study area.

5.7 Historical Use Summary

The subject area and adjoining properties have been historically used for agricultural and/or residential purposes or been left vacant and undeveloped. Some of the sites are covered with wooded areas.

5.8 Limitations

Limitations related to the records review include, but are not limited to, relying on information contained in the database record.

6.0 SITE RECONNAISSANCE

6.1 Introduction

On March 9, 2023, personnel from USACE conducted a site reconnaissance of the study area. The objective of the site reconnaissance was to obtain information that could assist in identifying adverse environmental conditions at the study area, assess whether there were obvious impacts to the environment from current or historic operations, and to observe adjacent parcels of property. The following sections present the information gathered.

6.2 Methodology

The following methodology was used when performing the site visit:

- USACE personnel walked the grounds and the perimeter of the study area as permitted by rights of entry of the property owners.
- Land use and types of operations to the north, south, east, and west of the study area was observed.

6.3 Site Observations

The site reconnaissance was conducted to visually identify suspected or known environmental conditions. Information gathered regarding a suspected or known environmental concern based on the site visit observations is presented below. Additional related information may be presented in other sections of this report.

- No evidence of the use or storage of oil or hazardous substances was observed.
- No evidence of Underground Storage Tanks (USTs) or Aboveground Storage Tanks (ASTs) was observed.
- No odors were identified during the site reconnaissance.
- **Pools of standing water (storm water) were observed within the study area.**
- **One metal and two plastic drums were observed within the study area, on the Kelly property.**
- No electrical or hydraulic equipment were observed.
- No pits, ponds, or lagoons were observed.
- No areas of stained soil or pavement were observed.

- No areas of stressed vegetation or were observed.
- **Solid waste (tires, concrete, pressure treated wood, metal, a basketball, empty glass containers, and empty plastic containers) was noted sparsely throughout the study area.**
- No evidence of wastewater or other liquid or any such discharge was observed.
- **Two potentially abandoned water wells were observed, but outside the study area.**
- No indication of on-site septic systems or cesspools was observed.

Overall, the floodplain is undeveloped and is largely wooded along with some smaller vegetation. In a few of the parcels, standing water was observed, likely from a recent rain event. No sheens or odors were observed in any standing water. In Conn34, two empty food grade drums and one empty metal drum was noted. All drums are suspected to have been used for maple syrup production as the metal drum had "Burke Mountain Maple Company" imprinted into the surface of the metal. Several other pieces of miscellaneous trash near the drums also pointed to their use for maple syrup production, including plastic tubing strung between several trees and the foundation of what appears to have been a sugar shack, where sap would have been boiled down. Other pieces of solid waste were on Conn34 near the old sugar shack as well as on the side of the slope of a tributary. Other solid waste was noted on Conn40 near and next to an old uninhabited cabin, which was outside the study area. Solid waste was sparse outside of those locations and typically included plastic bottles, aluminum cans, pieces of metal roofing, tires, and plastic buckets. Two potentially abandoned water wells were observed on Conn40 near the old uninhabited cabin and were located outside of the study area. None of the observations made during site reconnaissance are significant environmental concerns within the study area.

6.4 Adjoining Property Observations

Adjoining properties consist of vacant, undeveloped land, wooded areas, agricultural land, or residential units. In addition, there are some roads that go through the adjoining properties.

6.5 Additional Site Reconnaissance Activities

No additional services beyond "appropriate inquiry" as defined by the ASTM Phase I Standard were performed during this assessment.

6.6 Limitations

6.6.1 Subject Properties

Limitations imposed during the site reconnaissance regarding the subject properties included but are not limited to, the following:

- Estimation of the exact boundaries of the study area
- Dense vegetation
- Rights of entry by property owners

6.6.2 Adjoining Properties

Limitations imposed during the site reconnaissance regarding the adjoining properties included partial views or total obstructions due to viewing angle, structures, vegetation, topography, and distance.

7.0 INTERVIEWS CONDUCTED

An interview was conducted on March 8, 2023, with Mike Wheeler. Information provided by Mr. Wheeler indicated that there was a heating oil tank and a power transformer on the property. The power transformer is owned by Northwest Rural Electric Cooperative Association. Mr. Wheeler also mentioned that when a well was being installed, there was a pit dug out that was somewhere near the well. None of these items are located within the flood plain or areas likely to be inundated post-construction.

7.1 Limitations

Real estate access was limited to a few properties with the signed rights of entry as shown on Figure 2. Of those properties, only one of the owners, Mr. Wheeler, agreed to an interview.

8.0 DATA GAPS

The ASTM 1527-05 Standard defines a Data Gap as "…a lack of or inability to obtain information required by this practice despite good faith efforts by the Environmental Professional (EP) to gather such information." Data gaps may result from incompleteness in any of the Phase I ESA activities required by this practice (e.g., site reconnaissance, interviews, etc.).

A data gap by itself is not inherently significant. A data gap is only significant if other information and/or professional experience raises reasonable concerns involving the data gap. Significant data gaps are those that affect the ability of the EP to identify recognized environmental conditions (RECs) and identify the sources of information that were consulted to address the data gaps.

No significant data gaps were identified during the performance of this Phase I ESA. Parcels without rights of entry are assumed to be similar to the parcels that were evaluated.

9.0 CONCLUSIONS

This Phase I Environmental Site Assessment was performed within the scope, limitations, and liability limitations of ASTM Practice E1527. Any exceptions to, or deletions from, this practice are described in Section 7.0 of this report. This assessment has revealed no evidence of recognized environmental conditions in connection with the study area.

10.0 ASSUMPTIONS, LIMITATIONS, EXCEPTIONS, TERMS AND USER RELIANCE

The following items should be taken into consideration when reading this report.

Significant Assumptions

USACE personnel completed this assessment with the following significant assumptions in mind:

- Unless obviously inaccurate or if information exists to the contrary, USACE assumes that information collected during this environmental site assessment is accurate and correct.
- The conditions on properties with no rights of entry are assumed to be similar to the properties visited as assessed.

Limitations

This report was prepared in keeping with accepted standards of practice for preparation of preliminary environmental assessments and limited investigations and using USACE's professional judgment. The findings and conclusions of this report cannot be considered scientific certainties, but rather our opinions considering the limited data gathered during the course of our preliminary environmental investigation. USACE makes no claims as to the presence or absence of subsurface contamination at the site. No other warranties, either expressed or implied, are made herein.

The limitations imposed during the preparation of this report include, but may not be limited to, those noted at the end of relevant sections of this report.

Exceptions

There were no exceptions to the standards during the preparation of this report.

Special Terms and Conditions

There are no special terms or conditions related to this Phase I assessment.

User Reliance

The contents of this document cannot be used or relied upon by any party other than the user, U.S. Army Corps of Engineers – Buffalo District, without the express written consent of USACE.

Purpose

The purpose of the Phase I Environmental Site Assessment is to evaluate, pursuant to the process previously described, whether or not hazardous substances or petroleum products may be present in the study area under conditions suggesting that a release, past release, or material threat of a release to the subject area may have occurred, and to conclude whether or not recognized environmental conditions (RECs) exist based on the results of the process. This assessment is not intended to identify *de minimis* conditions that do not present a significant risk of harm to public health or the environment, and that would generally not be subject to enforcement action if brought to the attention of appropriate governmental agencies.

11.0 SIGNATURES AND QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS

I declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in §312.10 of 40 CFR 312, and I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the study area. I have developed and performed all the appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

AUFDERHEIDE.ANDREW.JONATHAN.1594387992

Digitally signed by AUFDERHEIDE.ANDREW.JONATHAN.1594387992
Date: 2023.04.25 14:13:36 -04'00'

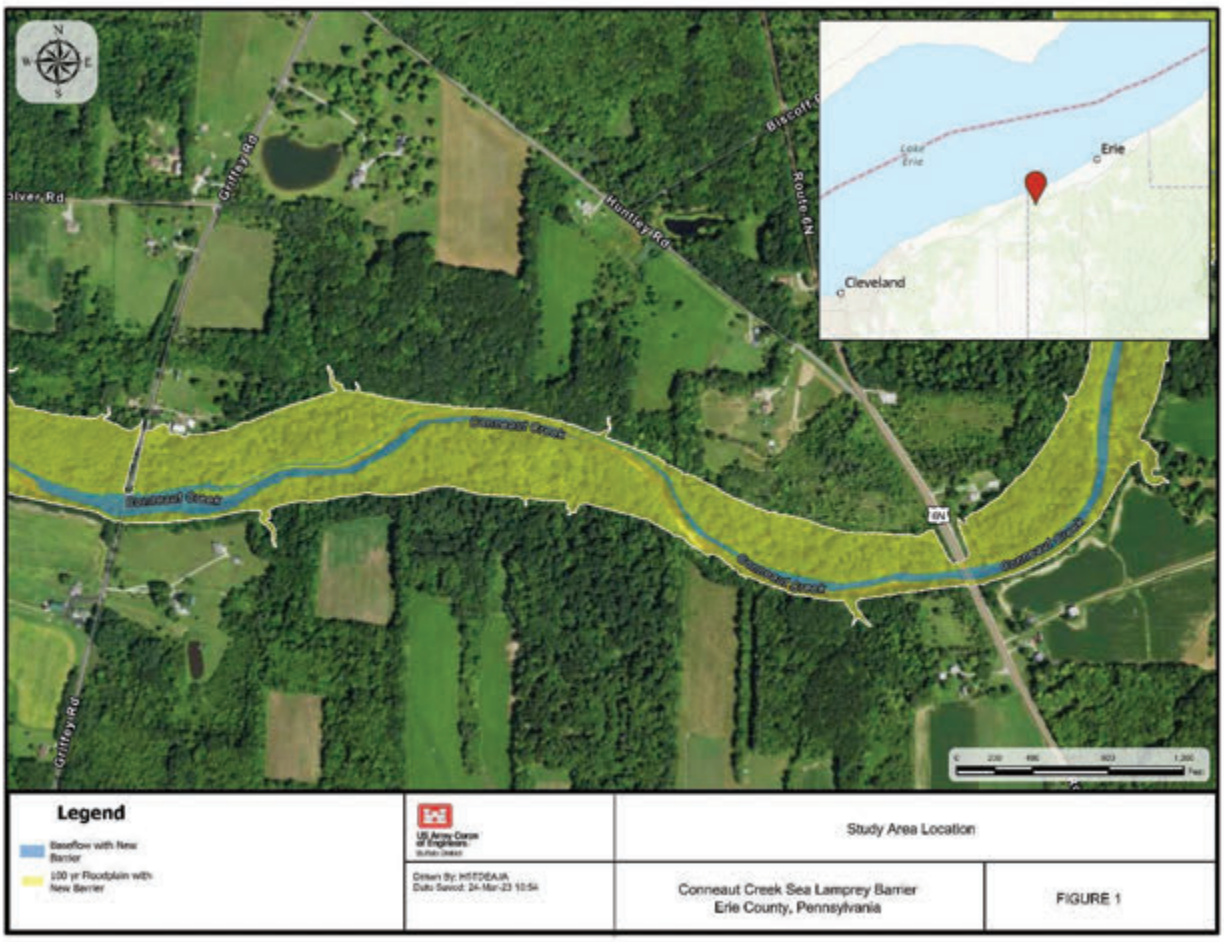
Andrew Aufderheide, EIT
Environmental Engineer

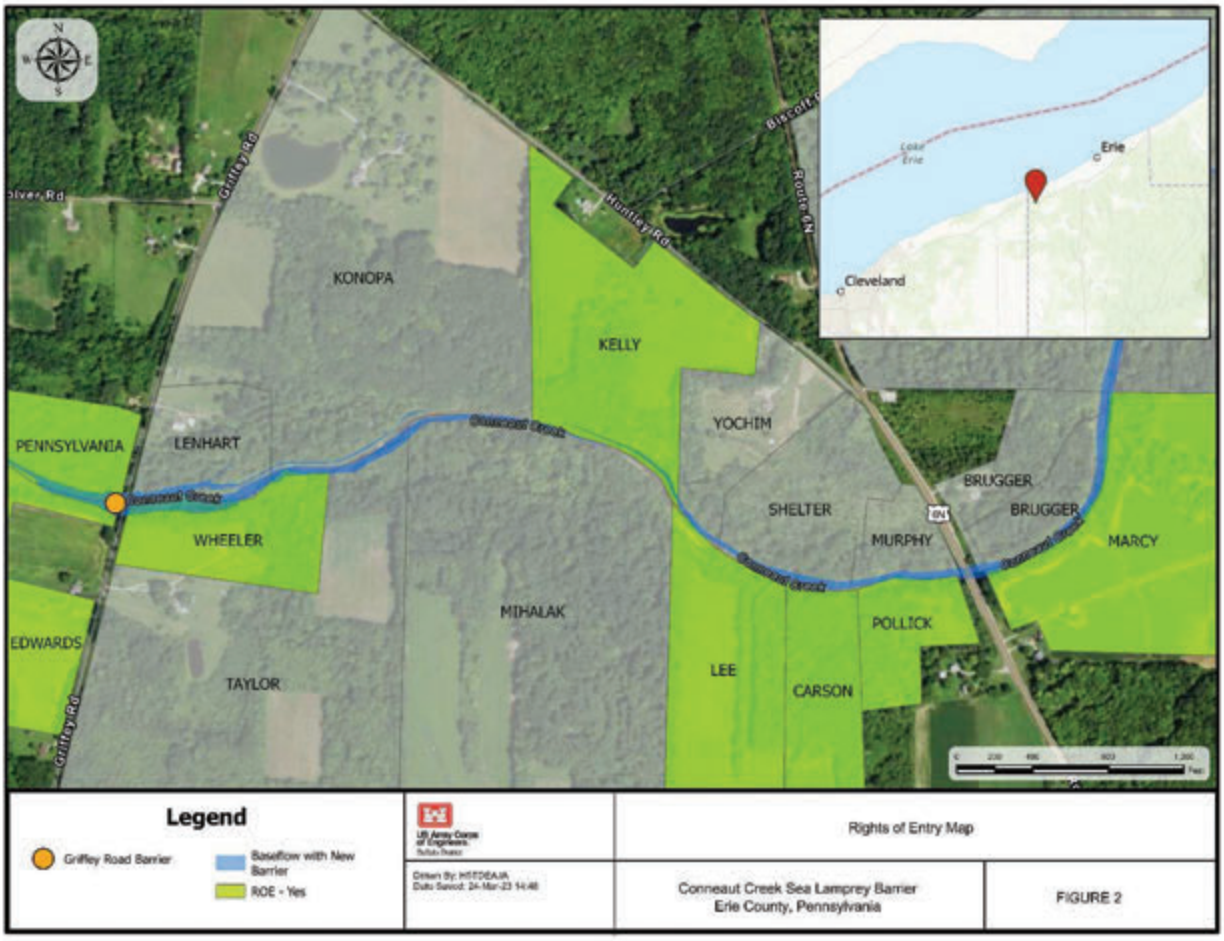
HALL.JEFFREY.S.1365011822

Digitally signed by HALL.JEFFREY.S.1365011822
Date: 2023.04.25 16:13:54 -04'00'

Jeffrey S. Hall, PE, PMP
Chief, Environmental Engineering Section

FIGURES


Griffey Rd
Huntley Rd
Route 6N
Erie
Cleveland
Lake Erie
Conneaut Creek
Legend
Baseflow with New Barrier
100 yr Floodplain with New Barrier
Study Area Location
Conneaut Creek Sea Lamprey Barrier
Erie County, Pennsylvania
FIGURE 1


Griffey Rd
Huntley Rd
Route 6N
KONOPA
KELLY
YOCHIM
PENNSYLVANIA
LENHART
WHEELER
SHELTER
BRUGGER
BRUGGER
MURPHY
MARCY
MIHALAK
POLLICK
EDWARDS
TAYLOR
LEE
CARSON
Griffey Rd
Lake Erie
Erie
Cleveland
Legend
Griffey Road Barrier
Baseflow with New Barrier
ROE - Yes
Rights of Entry Map
Conneaut Creek Sea Lamprey Barrier
Erie County, Pennsylvania
FIGURE 2

APPENDICES

Appendix A

Federal and State Database Records

IB Brown Road Study Area and
2A Griffey Road Study Area
West Springfield, PA 16443

Inquiry Number: 7079489.2s
August 10, 2022

The EDR Radius Map™ Report with GeoCheck®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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SECTION	PAGE
Executive Summary	ES1
Overview Map	2
Detail Map	3
Map Findings Summary	4
Map Findings	8
Orphan Summary	9
Government Records Searched/Data Currency Tracking	GR-1

GEOCHECK ADDENDUM

Physical Setting Source Addendum	A-1
Physical Setting Source Summary	A-2
Physical Setting Source Map	A-8
Physical Setting Source Map Findings	A-9
Physical Setting Source Records Searched	PSGR-1

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E1527-21), the ASTM Standard Practice for Environmental Site Assessments for Forestland or Rural Property (E 2247-16), the ASTM Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process (E 1528-14) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

2A GRIFFEY ROAD STUDY AREA
WEST SPRINGFIELD, PA 16443

COORDINATES

Latitude (North):	41.9150990 - 41ˆ 54' 54.35''
Longitude (West):	80.4843040 - 80ˆ 29' 3.49''
Universal Tranverse Mercator:	Zone 17
UTM X (Meters):	542766.7
UTM Y (Meters):	4640265.0
Elevation:	818 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	14042455 EAST SPRINGFIELD, PA
Version Date:	2019
West Map:	14438533 CONNEAUT, OH
Version Date:	2019

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20150724
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
2A GRIFFEY ROAD STUDY AREA
WEST SPRINGFIELD, PA 16443

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Lists of Federal NPL (Superfund) sites

NPL ---------- National Priority List
Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

Lists of Federal Delisted NPL sites

Delisted NPL ---------- National Priority List Deletions

Lists of Federal sites subject to CERCLA removals and CERCLA orders

FEDERAL FACILITY ---------- Federal Facility Site Information listing
SEMS ---------- Superfund Enterprise Management System

Lists of Federal CERCLA sites with NFRAP

SEMS-ARCHIVE ---------- Superfund Enterprise Management System Archive

Lists of Federal RCRA facilities undergoing Corrective Action

CORRACTS ---------- Corrective Action Report

Lists of Federal RCRA TSD facilities

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

Lists of Federal RCRA generators

RCRA-LQG ---------- RCRA - Large Quantity Generators
RCRA-SQG ---------- RCRA - Small Quantity Generators
RCRA-VSQG ---------- RCRA - Very Small Quantity Generators (Formerly Conditionally Exempt Small Quantity Generators)

Federal institutional controls / engineering controls registries

LUCIS ---------- Land Use Control Information System

US ENG CONTROLS---------- Engineering Controls Sites List
US INST CONTROLS---------- Institutional Controls Sites List

Federal ERNS list

ERNS---------- Emergency Response Notification System

Lists of state- and tribal (Superfund) equivalent sites

SHWS---------- Hazardous Sites Cleanup Act Site List
HSCA---------- HSCA Remedial Sites Listing

Lists of state and tribal landfills and solid waste disposal facilities

SWF/LF---------- Operating Facilities

Lists of state and tribal leaking storage tanks

LAST---------- Storage Tank Release Sites
LUST---------- Storage Tank Release Sites
INDIAN LUST---------- Leaking Underground Storage Tanks on Indian Land
UNREG LTANKS---------- Unregulated Tank Cases

Lists of state and tribal registered storage tanks

FEMA UST---------- Underground Storage Tank Listing
UST---------- Listing of Pennsylvania Regulated Underground Storage Tanks
AST---------- Listing of Pennsylvania Regulated Aboveground Storage Tanks
INDIAN UST---------- Underground Storage Tanks on Indian Land

State and tribal institutional control / engineering control registries

ENG CONTROLS---------- Engineering Controls Site Listing
INST CONTROL---------- Institutional Controls Site Listing
AUL---------- Environmental Covenants Listing

Lists of state and tribal voluntary cleanup sites

VCP---------- Voluntary Cleanup Program Listing
INDIAN VCP---------- Voluntary Cleanup Priority Listing

Lists of state and tribal brownfield sites

BROWNFIELDS---------- Brownfields Sites

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS---------- A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

HIST LF---------- Abandoned Landfill Inventory

INDIAN ODI	Report on the Status of Open Dumps on Indian Lands
DEBRIS REGION 9	Torres Martinez Reservation Illegal Dump Site Locations
ODI	Open Dump Inventory
IHS OPEN DUMPS	Open Dumps on Indian Land

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL	Delisted National Clandestine Laboratory Register
US CDL	National Clandestine Laboratory Register
PFAS	Sites With Known PFAS Contamination

Local Lists of Registered Storage Tanks

ARCHIVE UST	Archived Underground Storage Tank Sites
ARCHIVE AST	Archived Aboveground Storage Tank Sites

Local Land Records

LIENS 2	CERCLA Lien Information
ACT 2-DEED	Act 2-Deed Acknowledgment Sites

Records of Emergency Release Reports

HMIRS	Hazardous Materials Information Reporting System
SPILLS	State spills

Other Ascertainable Records

RCRA NonGen / NLR	RCRA - Non Generators / No Longer Regulated
FUDS	Formerly Used Defense Sites
DOD	Department of Defense Sites
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR	Financial Assurance Information
EPA WATCH LIST	EPA WATCH LIST
2020 COR ACTION	2020 Corrective Action Program List
TSCA	Toxic Substances Control Act
TRIS	Toxic Chemical Release Inventory System
SSTS	Section 7 Tracking Systems
ROD	Records Of Decision
RMP	Risk Management Plans
RAATS	RCRA Administrative Action Tracking System
PRP	Potentially Responsible Parties
PADS	PCB Activity Database System
ICIS	Integrated Compliance Information System
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS	Material Licensing Tracking System
COAL ASH DOE	Steam-Electric Plant Operation Data
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER	PCB Transformer Registration Database
RADINFO	Radiation Information Database
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS	Incident and Accident Data
CONSENT	Superfund (CERCLA) Consent Decrees
INDIAN RESERV	Indian Reservations

FUSRAP ---- Formerly Utilized Sites Remedial Action Program
UMTRA ---- Uranium Mill Tailings Sites
LEAD SMELTERS ---- Lead Smelter Sites
US AIRS ---- Aerometric Information Retrieval System Facility Subsystem
US MINES ---- Mines Master Index File
ABANDONED MINES ---- Abandoned Mines
FINDS ---- Facility Index System/Facility Registry System
UXO ---- Unexploded Ordnance Sites
DOCKET HWC ---- Hazardous Waste Compliance Docket Listing
ECHO ---- Enforcement & Compliance History Information
FUELS PROGRAM ---- EPA Fuels Program Registered Listing
AIRS ---- Permit and Emissions Inventory Data
ASBESTOS ---- ASBESTOS
DRYCLEANERS ---- Drycleaner Facility Locations
MANIFEST ---- Manifest Information
MINES ---- MINES
NPDES ---- NPDES Permit Listing
UIC ---- Underground Injection Wells
MINES MRDS ---- Mineral Resources Data System

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP ---- EDR Proprietary Manufactured Gas Plants
EDR Hist Auto ---- EDR Exclusive Historical Auto Stations
EDR Hist Cleaner ---- EDR Exclusive Historical Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS ---- Recovered Government Archive State Hazardous Waste Facilities List
RGA LF ---- Recovered Government Archive Solid Waste Facilities List
RGA LUST ---- Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

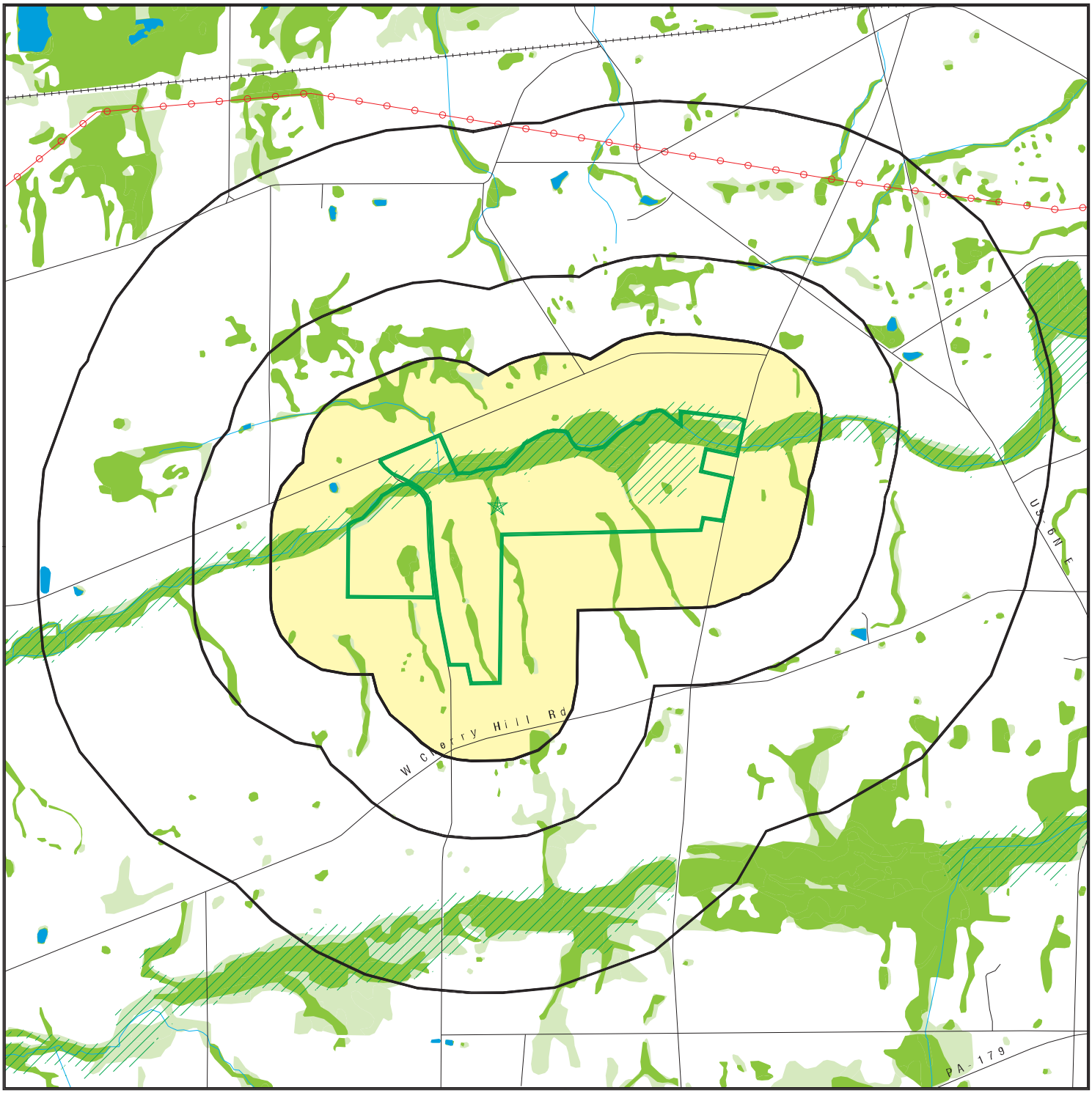
Surrounding sites were not identified.

Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

There were no unmapped sites in this report.

OVERVIEW MAP - 7079489.2S



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites

0 1/4 1/2 1 Miles

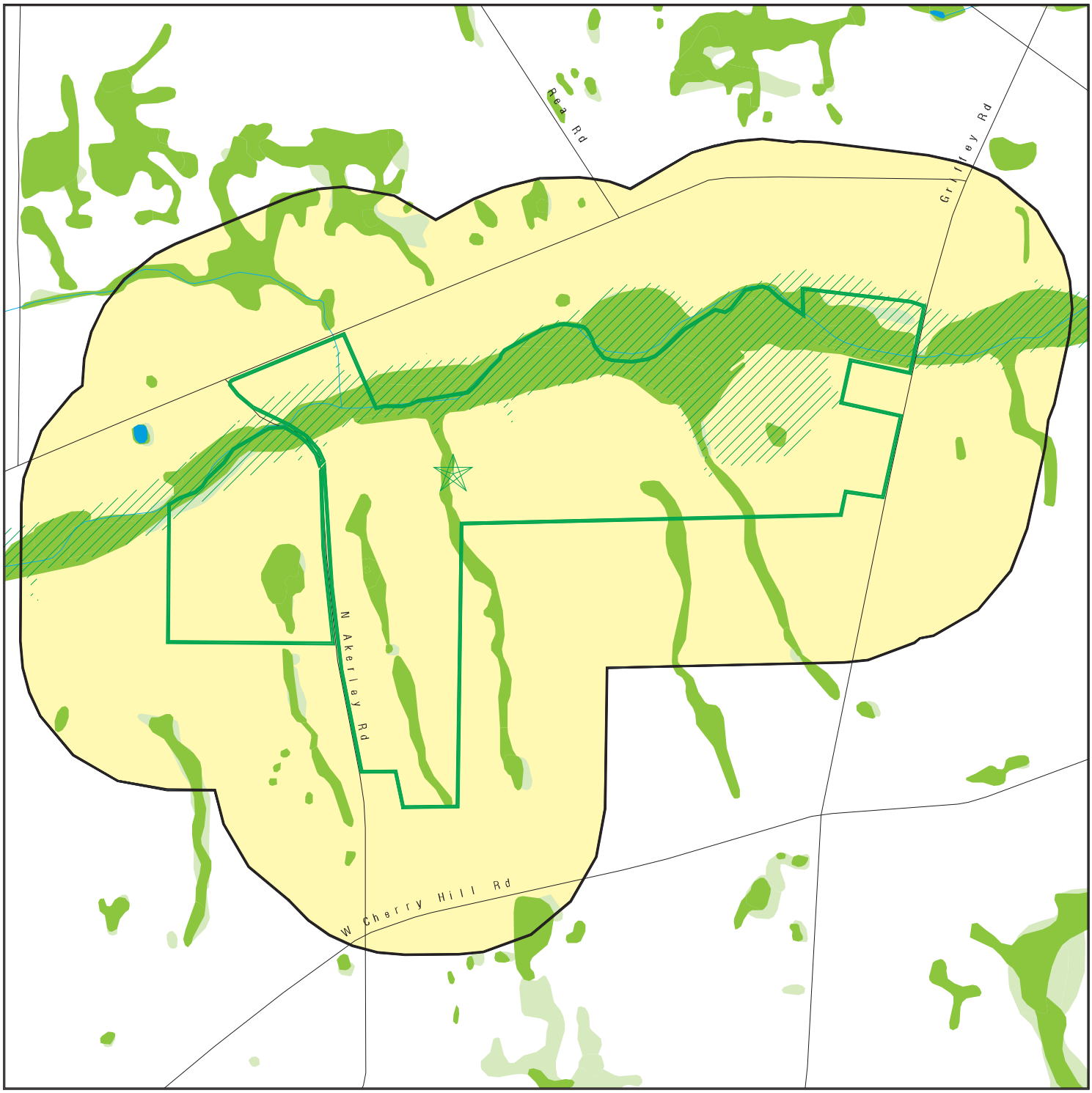
- Indian Reservations BIA
- Power transmission lines
- Special Flood Hazard Area (1%)
- 0.2% Annual Chance Flood Hazard
- National Wetland Inventory
- State Wetlands

N

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	IB Brown Road Study Area and	CLIENT:	U.S. Army Corps of Engineers
ADDRESS:	2A Griffey Road Study Area West Springfield PA 16443	CONTACT:	Martin Jander
LAT/LONG:	41.915099 / 80.484304	INQUIRY #:	7079489.2s
		DATE:	August 10, 2022 4:50 pm

DETAIL MAP - 7079489.2S



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites

0 1/8 1/4 1/2 Miles

- Indian Reservations BIA
- Special Flood Hazard Area (1%)
- 0.2% Annual Chance Flood Hazard
- National Wetland Inventory
- State Wetlands

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

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LAT/LONG:	41.915099 / 80.484304	INQUIRY #:	7079489.2s
		DATE:	August 10, 2022 4:50 pm

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Lists of Federal NPL (Superfund) sites								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	1.000		0	0	0	0	NR	0
Lists of Federal Delisted NPL sites								
Delisted NPL	1.000		0	0	0	0	NR	0
Lists of Federal sites subject to CERCLA removals and CERCLA orders								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	0	0	NR	NR	0
Lists of Federal CERCLA sites with NFRAP								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
Lists of Federal RCRA facilities undergoing Corrective Action								
CORRACTS	1.000		0	0	0	0	NR	0
Lists of Federal RCRA TSD facilities								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Lists of Federal RCRA generators								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-VSQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROLS	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	0.001		0	NR	NR	NR	NR	0
Lists of state- and tribal (Superfund) equivalent sites								
SHWS	1.000		0	0	0	0	NR	0
HSCA	1.000		0	0	0	0	NR	0
Lists of state and tribal landfills and solid waste disposal facilities								
SWF/LF	0.500		0	0	0	NR	NR	0
Lists of state and tribal leaking storage tanks								
LAST	0.500		0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
LUST	0.500		0	0	0	NR	NR	0
INDIAN LUST	0.500		0	0	0	NR	NR	0
UNREG LTANKS	0.500		0	0	0	NR	NR	0
Lists of state and tribal registered storage tanks								
FEMA UST	0.250		0	0	NR	NR	NR	0
UST	0.250		0	0	NR	NR	NR	0
AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal institutional control / engineering control registries								
ENG CONTROLS	0.500		0	0	0	NR	NR	0
INST CONTROL	0.500		0	0	0	NR	NR	0
AUL	0.500		0	0	0	NR	NR	0
Lists of state and tribal voluntary cleanup sites								
VCP	0.500		0	0	0	NR	NR	0
INDIAN VCP	0.500		0	0	0	NR	NR	0
Lists of state and tribal brownfield sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
HIST LF	0.500		0	0	0	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	0.001		0	NR	NR	NR	NR	0
US CDL	0.001		0	NR	NR	NR	NR	0
PFAS	0.500		0	0	0	NR	NR	0
Local Lists of Registered Storage Tanks								
ARCHIVE UST	0.250		0	0	NR	NR	NR	0
ARCHIVE AST	0.001		0	NR	NR	NR	NR	0
Local Land Records								
LIENS 2	0.001		0	NR	NR	NR	NR	0
ACT 2-DEED	0.500		0	0	0	NR	NR	0
Records of Emergency Release Reports								
HMIRS	0.001		0	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
SPILLS	0.001		0	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	0.001		0	NR	NR	NR	NR	0
EPA WATCH LIST	0.001		0	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	0.001		0	NR	NR	NR	NR	0
TRIS	0.001		0	NR	NR	NR	NR	0
SSTS	0.001		0	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	0.001		0	NR	NR	NR	NR	0
RAATS	0.001		0	NR	NR	NR	NR	0
PRP	0.001		0	NR	NR	NR	NR	0
PADS	0.001		0	NR	NR	NR	NR	0
ICIS	0.001		0	NR	NR	NR	NR	0
FTTS	0.001		0	NR	NR	NR	NR	0
MLTS	0.001		0	NR	NR	NR	NR	0
COAL ASH DOE	0.001		0	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	0.001		0	NR	NR	NR	NR	0
RADINFO	0.001		0	NR	NR	NR	NR	0
HIST FTTS	0.001		0	NR	NR	NR	NR	0
DOT OPS	0.001		0	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	0.001		0	NR	NR	NR	NR	0
US AIRS	0.001		0	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
ABANDONED MINES	0.250		0	0	NR	NR	NR	0
FINDS	0.001		0	NR	NR	NR	NR	0
UXO	1.000		0	0	0	0	NR	0
DOCKET HWC	0.001		0	NR	NR	NR	NR	0
ECHO	0.001		0	NR	NR	NR	NR	0
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
AIRS	0.001		0	NR	NR	NR	NR	0
ASBESTOS	0.001		0	NR	NR	NR	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
MANIFEST	0.250		0	0	NR	NR	NR	0
MINES	0.250		0	0	NR	NR	NR	0
NPDES	0.001		0	NR	NR	NR	NR	0
UIC	0.001		0	NR	NR	NR	NR	0
MINES MRDS	0.001		0	NR	NR	NR	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		0	NR	NR	NR	NR	0
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA HWS	0.001		0	NR	NR	NR	NR	0
RGA LF	0.001		0	NR	NR	NR	NR	0
RGA LUST	0.001		0	NR	NR	NR	NR	0
- Totals --		0	0	0	0	0	0	0

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

NO SITES FOUND

Count: 0 records.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
		NO SITES FOUND			

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Lists of Federal NPL (Superfund) sites

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 04/27/2022
Date Data Arrived at EDR: 05/05/2022
Date Made Active in Reports: 05/31/2022
Number of Days to Update: 26

Source: EPA
Telephone: N/A
Last EDR Contact: 08/02/2022
Next Scheduled EDR Contact: 10/10/2022
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 04/27/2022
Date Data Arrived at EDR: 05/05/2022
Date Made Active in Reports: 05/31/2022
Number of Days to Update: 26

Source: EPA
Telephone: N/A
Last EDR Contact: 08/02/2022
Next Scheduled EDR Contact: 10/10/2022
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

Lists of Federal Delisted NPL sites

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 04/27/2022
Date Data Arrived at EDR: 05/05/2022
Date Made Active in Reports: 05/31/2022
Number of Days to Update: 26

Source: EPA
Telephone: N/A
Last EDR Contact: 08/02/2022
Next Scheduled EDR Contact: 10/10/2022
Data Release Frequency: Quarterly

Lists of Federal sites subject to CERCLA removals and CERCLA orders

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 05/25/2021
Date Data Arrived at EDR: 06/24/2021
Date Made Active in Reports: 09/20/2021
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 06/27/2022
Next Scheduled EDR Contact: 10/10/2022
Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 04/27/2022
Date Data Arrived at EDR: 05/05/2022
Date Made Active in Reports: 05/31/2022
Number of Days to Update: 26

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 08/02/2022
Next Scheduled EDR Contact: 10/24/2022
Data Release Frequency: Quarterly

Lists of Federal CERCLA sites with NFRAP

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 04/27/2022
Date Data Arrived at EDR: 05/05/2022
Date Made Active in Reports: 05/31/2022
Number of Days to Update: 26

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 08/02/2022
Next Scheduled EDR Contact: 10/24/2022
Data Release Frequency: Quarterly

Lists of Federal RCRA facilities undergoing Corrective Action

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 06/20/2022
Date Data Arrived at EDR: 06/21/2022
Date Made Active in Reports: 06/28/2022
Number of Days to Update: 7

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 06/21/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Quarterly

Lists of Federal RCRA TSD facilities

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 06/20/2022
Date Data Arrived at EDR: 06/21/2022
Date Made Active in Reports: 06/28/2022
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 800-438-2474
Last EDR Contact: 06/21/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Quarterly

Lists of Federal RCRA generators

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 06/20/2022
Date Data Arrived at EDR: 06/21/2022
Date Made Active in Reports: 06/28/2022
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 800-438-2474
Last EDR Contact: 06/21/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 06/20/2022
Date Data Arrived at EDR: 06/21/2022
Date Made Active in Reports: 06/28/2022
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 800-438-2474
Last EDR Contact: 06/21/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Quarterly

RCRA-VSQG: RCRA - Very Small Quantity Generators (Formerly Conditionally Exempt Small Quantity Generators)

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Very small quantity generators (VSQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 06/20/2022
Date Data Arrived at EDR: 06/21/2022
Date Made Active in Reports: 06/28/2022
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 800-438-2474
Last EDR Contact: 06/21/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Quarterly

Federal institutional controls / engineering controls registries

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 05/16/2022
Date Data Arrived at EDR: 05/19/2022
Date Made Active in Reports: 07/29/2022
Number of Days to Update: 71

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 08/03/2022
Next Scheduled EDR Contact: 11/21/2022
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 05/16/2022
Date Data Arrived at EDR: 05/24/2022
Date Made Active in Reports: 07/29/2022
Number of Days to Update: 66

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 05/24/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Varies

US INST CONTROLS: Institutional Controls Sites List

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 05/16/2022
Date Data Arrived at EDR: 05/24/2022
Date Made Active in Reports: 07/29/2022
Number of Days to Update: 66

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 05/04/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 06/14/2022
Date Data Arrived at EDR: 06/15/2022
Date Made Active in Reports: 06/21/2022
Number of Days to Update: 6

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 06/15/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Quarterly

Lists of state- and tribal (Superfund) equivalent sites

SHWS: Hazardous Sites Cleanup Act Site List

The Hazardous Sites Cleanup Act Site List includes sites listed on PA Priority List, sites delisted from PA Priority List, Interim Response Completed sites, and Sites Being Studied or Response Being Planned.

Date of Government Version: 04/12/2022
Date Data Arrived at EDR: 04/13/2022
Date Made Active in Reports: 07/08/2022
Number of Days to Update: 86

Source: Department Environmental Protection
Telephone: 717-783-7816
Last EDR Contact: 07/12/2022
Next Scheduled EDR Contact: 10/24/2022
Data Release Frequency: Quarterly

HSCA: HSCA Remedial Sites Listing

A list of remedial sites on the PA Priority List. This is the PA state equivalent of the federal NPL superfund list.

Date of Government Version: 06/30/2021
Date Data Arrived at EDR: 01/13/2022
Date Made Active in Reports: 03/24/2022
Number of Days to Update: 70

Source: Department of Environmental Protection
Telephone: 717-783-7816
Last EDR Contact: 07/14/2021
Next Scheduled EDR Contact: 10/24/2022
Data Release Frequency: Annually

Lists of state and tribal landfills and solid waste disposal facilities

SWF/LF: Operating Facilities

The listing includes Municipal Waste Landfills, Construction/Demolition Waste Landfills and Waste-to-Energy Facilities.

Date of Government Version: 02/08/2022
Date Data Arrived at EDR: 03/23/2022
Date Made Active in Reports: 05/17/2022
Number of Days to Update: 55

Source: Department of Environmental Protection
Telephone: 717-787-7564
Last EDR Contact: 05/16/2022
Next Scheduled EDR Contact: 08/29/2022
Data Release Frequency: Semi-Annually

Lists of state and tribal leaking storage tanks

LUST: Storage Tank Release Sites

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 03/09/2022
Date Data Arrived at EDR: 03/10/2022
Date Made Active in Reports: 06/07/2022
Number of Days to Update: 89

Source: Department of Environmental Protection
Telephone: 717-783-7509
Last EDR Contact: 06/08/2022
Next Scheduled EDR Contact: 09/19/2022
Data Release Frequency: Quarterly

LAST: Storage Tank Release Sites

Leaking Aboveground Storage Tank Incident Reports.

Date of Government Version: 03/09/2022
Date Data Arrived at EDR: 03/10/2022
Date Made Active in Reports: 06/07/2022
Number of Days to Update: 89

Source: Department of Environmental Protection
Telephone: 717-783-7509
Last EDR Contact: 06/08/2022
Next Scheduled EDR Contact: 09/19/2022
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 04/28/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 05/28/2021
Date Data Arrived at EDR: 06/22/2021
Date Made Active in Reports: 09/20/2021
Number of Days to Update: 90

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

UNREG LTANKS: Unregulated Tank Cases
Leaking storage tank cases from unregulated storage tanks.

Date of Government Version: 04/12/2002
Date Data Arrived at EDR: 08/14/2003
Date Made Active in Reports: 08/29/2003
Number of Days to Update: 15

Source: Department of Environmental Protection
Telephone: 717-783-7509
Last EDR Contact: 08/14/2003
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Lists of state and tribal registered storage tanks

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 10/14/2021
Date Data Arrived at EDR: 11/05/2021
Date Made Active in Reports: 02/01/2022
Number of Days to Update: 88

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 06/29/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: Varies

UST: Listing of Pennsylvania Regulated Underground Storage Tanks
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 03/01/2022
Date Data Arrived at EDR: 03/09/2022
Date Made Active in Reports: 06/06/2022
Number of Days to Update: 89

Source: Department of Environmental Protection
Telephone: 717-772-5599
Last EDR Contact: 06/08/2022
Next Scheduled EDR Contact: 09/19/2022
Data Release Frequency: Varies

AST: Listing of Pennsylvania Regulated Aboveground Storage Tanks
Registered Aboveground Storage Tanks.

Date of Government Version: 03/01/2022
Date Data Arrived at EDR: 03/09/2022
Date Made Active in Reports: 06/06/2022
Number of Days to Update: 89

Source: Department of Environmental Protection
Telephone: 717-772-5599
Last EDR Contact: 06/08/2022
Next Scheduled EDR Contact: 09/19/2022
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 05/28/2021
Date Data Arrived at EDR: 06/22/2021
Date Made Active in Reports: 09/20/2021
Number of Days to Update: 90

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 04/06/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 10/14/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

State and tribal institutional control / engineering control registries

ENG CONTROLS: Engineering Controls Site Listing

Under the Land Recycling Act (Act 2) persons who perform a site cleanup using the site-specific standard or the special industrial area standard may use engineering or institutional controls as part of the response action. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 05/15/2008
Date Data Arrived at EDR: 05/16/2008
Date Made Active in Reports: 06/12/2008
Number of Days to Update: 27

Source: Department of Environmental Protection
Telephone: 717-783-9470
Last EDR Contact: 07/06/2022
Next Scheduled EDR Contact: 10/24/2022
Data Release Frequency: No Update Planned

AUL: Environmental Covenants Listing

A listing of sites with environmental covenants.

Date of Government Version: 04/12/2022
Date Data Arrived at EDR: 04/13/2022
Date Made Active in Reports: 07/08/2022
Number of Days to Update: 86

Source: Department of Environmental Protection
Telephone: 717-783-7509
Last EDR Contact: 07/12/2022
Next Scheduled EDR Contact: 10/24/2022
Data Release Frequency: Quarterly

INST CONTROL: Institutional Controls Site Listing

Under the Land Recycling Act (Act 2) persons who perform a site cleanup using the site-specific standard or the special industrial area standard may use engineering or institutional controls as part of the response action. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 05/15/2008
Date Data Arrived at EDR: 05/16/2008
Date Made Active in Reports: 06/12/2008
Number of Days to Update: 27

Source: Department of Environmental Protection
Telephone: 717-783-9470
Last EDR Contact: 07/06/2022
Next Scheduled EDR Contact: 10/24/2022
Data Release Frequency: No Update Planned

Lists of state and tribal voluntary cleanup sites

VCP: Voluntary Cleanup Program Sites

The VCP listings included Completed Sites, Sites in Progress and Act 2 Non-Use Aquifer Determinations Sites. Formerly known as the Act 2, the Land Recycling Program encourages the voluntary cleanup and reuse of contaminated commercial and industrial sites.

Date of Government Version: 04/05/2022
Date Data Arrived at EDR: 04/05/2022
Date Made Active in Reports: 06/29/2022
Number of Days to Update: 85
Source: Department of Environmental Protection
Telephone: 717-783-2388
Last EDR Contact: 07/06/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: Quarterly

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27
Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 07/08/2021
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142
Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 06/15/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Varies

Lists of state and tribal brownfield sites

BROWNFIELDS: Brownfields Sites
Brownfields are generally defined as abandoned or underused industrial or commercial properties where redevelopment is complicated by actual or perceived environmental contamination. Brownfields vary in size, location, age and past use. They can range from a small, abandoned corner gas station to a large, multi-acre former manufacturing plant that has been closed for years.

Date of Government Version: 04/12/2022
Date Data Arrived at EDR: 04/13/2022
Date Made Active in Reports: 07/08/2022
Number of Days to Update: 86
Source: Department of Environmental Protection
Telephone: 717-783-1566
Last EDR Contact: 07/12/2022
Next Scheduled EDR Contact: 10/24/2022
Data Release Frequency: Quarterly

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 02/23/2022
Date Data Arrived at EDR: 03/10/2022
Date Made Active in Reports: 03/10/2022
Number of Days to Update: 0
Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 08/08/2022
Next Scheduled EDR Contact: 09/26/2022
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

HIST LF ALI: Abandoned Landfill Inventory

The report provides facility information recorded in the Pennsylvania Department of Environmental Protection ALI database. Some of this information has been abstracted from old records and may not accurately reflect the current conditions and status at these facilities

Date of Government Version: 04/07/2022
Date Data Arrived at EDR: 04/07/2022
Date Made Active in Reports: 07/06/2022
Number of Days to Update: 90

Source: Department of Environmental Protection
Telephone: 717-787-7564
Last EDR Contact: 03/23/2022
Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: No Update Planned

HIST LF INVENTORY: Facility Inventory

A listing of solid waste facilities. This listing is no longer updated or maintained by the Department of Environmental Protection. At the time the listing was available, the DEP?s name was the Department of Environmental Resources.

Date of Government Version: 06/02/1999
Date Data Arrived at EDR: 07/12/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 30

Source: Department of Environmental Protection
Telephone: 717-787-7381
Last EDR Contact: 09/19/2005
Next Scheduled EDR Contact: 12/19/2005
Data Release Frequency: No Update Planned

HIST LF INACTIVE: Inactive Facilities List

A listing of inactive non-hazardous facilities (10000 & 300000 series). This listing is no longer updated or maintained by the Department of Environmental Protection. At the time the listing was available, the DEP?s name was the Department of Environmental Resources.

Date of Government Version: 12/20/1994
Date Data Arrived at EDR: 07/12/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 30

Source: Department of Environmental Protection
Telephone: 717-787-7381
Last EDR Contact: 06/21/2005
Next Scheduled EDR Contact: 12/19/2005
Data Release Frequency: No Update Planned

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands

Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 07/21/2022
Next Scheduled EDR Contact: 11/07/2022
Data Release Frequency: Varies

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 07/12/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: No Update Planned

IHS OPEN DUMPS: Open Dumps on Indian Land

A listing of all open dumps located on Indian Land in the United States.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 08/06/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 176

Source: Department of Health & Human Serivces, Indian Health Service
Telephone: 301-443-1452
Last EDR Contact: 07/21/2022
Next Scheduled EDR Contact: 11/07/2022
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 04/30/2022
Date Data Arrived at EDR: 05/24/2022
Date Made Active in Reports: 07/29/2022
Number of Days to Update: 66

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/24/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: No Update Planned

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 04/30/2022
Date Data Arrived at EDR: 05/24/2022
Date Made Active in Reports: 07/29/2022
Number of Days to Update: 66

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/24/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Quarterly

PFAS: Sites With Known PFAS Contamination

Perfluoroalkyl and polyfluoroalkyl substances (PFAS) are man-made chemicals, are resistant to heat, water and oil, and persist in the environment and the human body. PFAS are not found naturally in the environment. They have been used to make cookware, carpets, clothing, fabrics for furniture, paper packaging for food, and other materials that are resistant to water, grease, or stains. They are also used in firefighting foams and in a number of industrial processes.

Date of Government Version: 11/23/2021
Date Data Arrived at EDR: 12/22/2021
Date Made Active in Reports: 03/15/2022
Number of Days to Update: 83

Source: Department of Environmental Protection
Telephone: 717-787-4728
Last EDR Contact: 06/23/2022
Next Scheduled EDR Contact: 09/26/2022
Data Release Frequency: Varies

Local Lists of Registered Storage Tanks

ARCHIVE UST: Archived Underground Storage Tank Sites

The list includes tanks storing highly hazardous substances that were removed from the DEP's Storage Tank Information database because of the Department's policy on sensitive information. The list also may include tanks that are removed or permanently closed.

Date of Government Version: 03/09/2022
Date Data Arrived at EDR: 03/10/2022
Date Made Active in Reports: 06/06/2022
Number of Days to Update: 88

Source: Department of Environmental Protection
Telephone: 717-772-5599
Last EDR Contact: 06/08/2022
Next Scheduled EDR Contact: 09/19/2022
Data Release Frequency: Varies

ARCHIVE AST: Archived Aboveground Storage Tank Sites

The list includes aboveground tanks with a capacity greater than 21,000 gallons that were removed from the DEP's Storage Tank Information database because of the Department's policy on sensitive information. The list also may include tanks that are removed or permanently closed.

Date of Government Version: 03/09/2022
Date Data Arrived at EDR: 03/10/2022
Date Made Active in Reports: 06/06/2022
Number of Days to Update: 88

Source: Department of Environmental Protection
Telephone: 717-772-5599
Last EDR Contact: 06/08/2022
Next Scheduled EDR Contact: 09/19/2022
Data Release Frequency: Varies

Local Land Records

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 04/27/2022
Date Data Arrived at EDR: 05/05/2022
Date Made Active in Reports: 05/31/2022
Number of Days to Update: 26

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 08/02/2022
Next Scheduled EDR Contact: 10/10/2022
Data Release Frequency: Semi-Annually

ACT 2-DEED: Act 2-Deed Acknowledgment Sites

This listing pertains to sites where the Department has approved a cleanup requiring a deed acknowledgment under Act 2. This list includes sites remediated to a non-residential Statewide health standard (Section 303(g)); all sites demonstrating attainment of a Site-specific standard (Section 304(m)); and sites being remediated as a special industrial area (Section 305(g)). Persons who remediated a site to a standard that requires a deed acknowledgment shall comply with the requirements of the Solid Waste Management Act or the Hazardous Sites Cleanup Act, as referenced in Act 2. These statutes require a property description section in the deed concerning the hazardous substance disposal on the site. The location of disposed hazardous substances and a description of the type of hazardous substances disposed on the site shall be included in the deed acknowledgment. A deed acknowledgment is required at the time of conveyance of the property.

Date of Government Version: 04/23/2010
Date Data Arrived at EDR: 04/28/2010
Date Made Active in Reports: 04/30/2010
Number of Days to Update: 2

Source: Department of Environmental Protection
Telephone: 717-783-9470
Last EDR Contact: 07/22/2011
Next Scheduled EDR Contact: 11/07/2011
Data Release Frequency: Varies

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 03/21/2022
Date Data Arrived at EDR: 03/21/2022
Date Made Active in Reports: 06/14/2022
Number of Days to Update: 85

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 06/21/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Quarterly

SPILLS: State spills

A listing of hazardous material incidents.

Date of Government Version: 04/20/2022
Date Data Arrived at EDR: 04/29/2022
Date Made Active in Reports: 07/19/2022
Number of Days to Update: 81

Source: DEP, Emergency Response
Telephone: 717-787-5715
Last EDR Contact: 07/27/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: Semi-Annually

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 06/20/2022
Date Data Arrived at EDR: 06/21/2022
Date Made Active in Reports: 06/28/2022
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 800-438-2474
Last EDR Contact: 06/21/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Quarterly

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 05/11/2022
Date Data Arrived at EDR: 05/17/2022
Date Made Active in Reports: 07/29/2022
Number of Days to Update: 73

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 05/17/2022
Next Scheduled EDR Contact: 08/29/2022
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 06/07/2021
Date Data Arrived at EDR: 07/13/2021
Date Made Active in Reports: 03/09/2022
Number of Days to Update: 239

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 07/13/2022
Next Scheduled EDR Contact: 10/24/2022
Data Release Frequency: Varies

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 04/02/2018
Date Data Arrived at EDR: 04/11/2018
Date Made Active in Reports: 11/06/2019
Number of Days to Update: 574

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 07/08/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 01/01/2017
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 08/03/2022
Next Scheduled EDR Contact: 11/21/2022
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 03/21/2022
Date Data Arrived at EDR: 03/21/2022
Date Made Active in Reports: 06/14/2022
Number of Days to Update: 85

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 06/21/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 07/29/2022
Next Scheduled EDR Contact: 11/14/2022
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 09/30/2017
Date Data Arrived at EDR: 05/08/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 73

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 08/04/2022
Next Scheduled EDR Contact: 11/14/2022
Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 06/17/2020
Date Made Active in Reports: 09/10/2020
Number of Days to Update: 85

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 06/14/2022
Next Scheduled EDR Contact: 09/26/2022
Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2018
Date Data Arrived at EDR: 08/14/2020
Date Made Active in Reports: 11/04/2020
Number of Days to Update: 82

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 05/20/2022
Next Scheduled EDR Contact: 08/29/2022
Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 07/18/2022
Date Data Arrived at EDR: 07/18/2022
Date Made Active in Reports: 07/29/2022
Number of Days to Update: 11

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 07/18/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 04/27/2022
Date Data Arrived at EDR: 05/05/2022
Date Made Active in Reports: 05/31/2022
Number of Days to Update: 26

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 08/02/2022
Next Scheduled EDR Contact: 09/12/2022
Data Release Frequency: Annually

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 04/27/2022
Date Data Arrived at EDR: 05/04/2022
Date Made Active in Reports: 05/10/2022
Number of Days to Update: 6

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 07/14/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 01/25/2022
Date Data Arrived at EDR: 02/03/2022
Date Made Active in Reports: 02/25/2022
Number of Days to Update: 22

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 08/02/2022
Next Scheduled EDR Contact: 11/14/2022
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 01/20/2022
Date Data Arrived at EDR: 01/20/2022
Date Made Active in Reports: 03/25/2022
Number of Days to Update: 64

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 07/08/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/18/2016
Date Data Arrived at EDR: 11/23/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 79

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 06/28/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: Quarterly

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: No Update Planned

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: No Update Planned

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 03/11/2022
Date Data Arrived at EDR: 03/15/2022
Date Made Active in Reports: 06/14/2022
Number of Days to Update: 91

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 07/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2020
Date Data Arrived at EDR: 11/30/2021
Date Made Active in Reports: 02/22/2022
Number of Days to Update: 84

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 06/02/2022
Next Scheduled EDR Contact: 09/12/2022
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 01/12/2017
Date Data Arrived at EDR: 03/05/2019
Date Made Active in Reports: 11/11/2019
Number of Days to Update: 251
Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 05/25/2022
Next Scheduled EDR Contact: 09/12/2022
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 09/13/2019
Date Data Arrived at EDR: 11/06/2019
Date Made Active in Reports: 02/10/2020
Number of Days to Update: 96
Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 08/04/2022
Next Scheduled EDR Contact: 11/14/2022
Data Release Frequency: Varies

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 07/01/2019
Date Data Arrived at EDR: 07/01/2019
Date Made Active in Reports: 09/23/2019
Number of Days to Update: 84
Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 06/23/2022
Next Scheduled EDR Contact: 10/10/2022
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data
Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 01/02/2020
Date Data Arrived at EDR: 01/28/2020
Date Made Active in Reports: 04/17/2020
Number of Days to Update: 80

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 07/21/2022
Next Scheduled EDR Contact: 11/07/2022
Data Release Frequency: Quarterly

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 03/31/2022
Date Data Arrived at EDR: 04/14/2022
Date Made Active in Reports: 07/12/2022
Number of Days to Update: 89

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 06/29/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2019
Date Data Arrived at EDR: 03/02/2022
Date Made Active in Reports: 03/25/2022
Number of Days to Update: 23

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 06/21/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Biennially

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 07/14/2015
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 546

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 07/08/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program

DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 07/26/2021
Date Data Arrived at EDR: 07/27/2021
Date Made Active in Reports: 10/22/2021
Number of Days to Update: 87

Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 07/26/2022
Next Scheduled EDR Contact: 11/14/2022
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 08/30/2019
Date Data Arrived at EDR: 11/15/2019
Date Made Active in Reports: 01/28/2020
Number of Days to Update: 74

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 05/16/2022
Next Scheduled EDR Contact: 08/29/2022
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites
A listing of former lead smelter site locations.

Date of Government Version: 04/27/2022
Date Data Arrived at EDR: 05/05/2022
Date Made Active in Reports: 05/31/2022
Number of Days to Update: 26

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 08/01/2022
Next Scheduled EDR Contact: 10/10/2022
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites
A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)
The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data
A listing of minor source facilities.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

MINES VIOLATIONS: MSHA Violation Assessment Data
Mines violation and assessment information. Department of Labor, Mine Safety & Health Administration.

Date of Government Version: 03/21/2022
Date Data Arrived at EDR: 03/22/2022
Date Made Active in Reports: 03/25/2022
Number of Days to Update: 3

Source: DOL, Mine Safety & Health Admi
Telephone: 202-693-9424
Last EDR Contact: 08/02/2022
Next Scheduled EDR Contact: 09/12/2022
Data Release Frequency: Quarterly

US MINES: Mines Master Index File
Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 05/02/2022
Date Data Arrived at EDR: 05/25/2022
Date Made Active in Reports: 07/29/2022
Number of Days to Update: 65

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 05/25/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Semi-Annually

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing

This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 05/06/2020
Date Data Arrived at EDR: 05/27/2020
Date Made Active in Reports: 08/13/2020
Number of Days to Update: 78

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 05/27/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing

Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 05/27/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Varies

ABANDONED MINES: Abandoned Mines

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 03/10/2022
Date Data Arrived at EDR: 03/10/2022
Date Made Active in Reports: 06/14/2022
Number of Days to Update: 96

Source: Department of Interior
Telephone: 202-208-2609
Last EDR Contact: 06/14/2022
Next Scheduled EDR Contact: 09/19/2022
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 05/13/2022
Date Data Arrived at EDR: 05/18/2022
Date Made Active in Reports: 05/31/2022
Number of Days to Update: 13

Source: EPA
Telephone: (215) 814-5000
Last EDR Contact: 05/18/2022
Next Scheduled EDR Contact: 09/12/2022
Data Release Frequency: Quarterly

UXO: Unexploded Ordnance Sites

A listing of unexploded ordnance site locations

Date of Government Version: 12/31/2020
Date Data Arrived at EDR: 01/11/2022
Date Made Active in Reports: 02/14/2022
Number of Days to Update: 34

Source: Department of Defense
Telephone: 703-704-1564
Last EDR Contact: 07/07/2022
Next Scheduled EDR Contact: 10/24/2022
Data Release Frequency: Varies

ECHO: Enforcement & Compliance History Information

ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 04/02/2022
Date Data Arrived at EDR: 04/05/2022
Date Made Active in Reports: 06/28/2022
Number of Days to Update: 84

Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 07/01/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: Quarterly

DOCKET HWC: Hazardous Waste Compliance Docket Listing
A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 05/06/2021
Date Data Arrived at EDR: 05/21/2021
Date Made Active in Reports: 08/11/2021
Number of Days to Update: 82

Source: Environmental Protection Agency
Telephone: 202-564-0527
Last EDR Contact: 05/19/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Varies

FUELS PROGRAM: EPA Fuels Program Registered Listing
This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 05/16/2022
Date Data Arrived at EDR: 05/17/2022
Date Made Active in Reports: 07/29/2022
Number of Days to Update: 73

Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 05/17/2022
Next Scheduled EDR Contact: 08/29/2022
Data Release Frequency: Quarterly

AIRS: Permit and Emissions Inventory Data
Permit and emissions inventory data.

Date of Government Version: 03/15/2022
Date Data Arrived at EDR: 03/16/2022
Date Made Active in Reports: 06/10/2022
Number of Days to Update: 86

Source: Department of Environmental Protection
Telephone: 717-787-9702
Last EDR Contact: 06/14/2022
Next Scheduled EDR Contact: 09/26/2022
Data Release Frequency: Annually

ASBESTOS: Asbestos Notification Listing
Asbestos sites

Date of Government Version: 06/01/2022
Date Data Arrived at EDR: 06/01/2022
Date Made Active in Reports: 06/13/2022
Number of Days to Update: 12

Source: Department of Labor & Industry
Telephone: 717-703-1092
Last EDR Contact: 06/01/2022
Next Scheduled EDR Contact: 09/12/2022
Data Release Frequency: Varies

DRYCLEANERS: Drycleaner Facility Locations
A listing of drycleaner facility locations.

Date of Government Version: 03/15/2022
Date Data Arrived at EDR: 03/16/2022
Date Made Active in Reports: 06/13/2022
Number of Days to Update: 89

Source: Department of Environmental Protection
Telephone: 717-787-9702
Last EDR Contact: 06/14/2022
Next Scheduled EDR Contact: 09/26/2022
Data Release Frequency: Quarterly

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 06/30/2018
Date Data Arrived at EDR: 07/19/2019
Date Made Active in Reports: 09/10/2019
Number of Days to Update: 53

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 07/06/2022
Next Scheduled EDR Contact: 10/24/2022
Data Release Frequency: Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

MINES: Abandoned Mine Land Inventory
This data set portrays the approximate location of Abandoned Mine Land Problem Areas containing public health, safety, and public welfare problems created by past coal mining.

Date of Government Version: 04/07/2022
Date Data Arrived at EDR: 04/20/2022
Date Made Active in Reports: 07/13/2022
Number of Days to Update: 84

Source: PASDA
Telephone: 814-863-0104
Last EDR Contact: 07/18/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Semi-Annually

NPDES: NPDES Permit Listing
A listing of facilities with an NPDES permit.

Date of Government Version: 05/31/2022
Date Data Arrived at EDR: 05/31/2022
Date Made Active in Reports: 06/13/2022
Number of Days to Update: 13

Source: Department of Environmental Protection
Telephone: 717-787-9642
Last EDR Contact: 05/31/2022
Next Scheduled EDR Contact: 09/12/2022
Data Release Frequency: Varies

UIC: Underground Injection Wells
A listing of underground injection well locations.

Date of Government Version: 03/15/2022
Date Data Arrived at EDR: 03/16/2022
Date Made Active in Reports: 06/13/2022
Number of Days to Update: 89

Source: Department of Environmental Protection
Telephone: 717-783-7209
Last EDR Contact: 06/14/2022
Next Scheduled EDR Contact: 09/26/2022
Data Release Frequency: Quarterly

PCS ENF: Enforcement data
No description is available for this data

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 02/05/2015
Date Made Active in Reports: 03/06/2015
Number of Days to Update: 29

Source: EPA
Telephone: 202-564-2497
Last EDR Contact: 06/28/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: Varies

PCS: Permit Compliance System
PCS is a computerized management information system that contains data on National Pollutant Discharge Elimination System (NPDES) permit holding facilities. PCS tracks the permit, compliance, and enforcement status of NPDES facilities.

Date of Government Version: 07/14/2011
Date Data Arrived at EDR: 08/05/2011
Date Made Active in Reports: 09/29/2011
Number of Days to Update: 55

Source: EPA, Office of Water
Telephone: 202-564-2496
Last EDR Contact: 06/28/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: Semi-Annually

PCS INACTIVE: Listing of Inactive PCS Permits
An inactive permit is a facility that has shut down or is no longer discharging.

Date of Government Version: 11/05/2014
Date Data Arrived at EDR: 01/06/2015
Date Made Active in Reports: 05/06/2015
Number of Days to Update: 120

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 06/28/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: Semi-Annually

MINES MRDS: Mineral Resources Data System
Mineral Resources Data System

Date of Government Version: 04/06/2018
Date Data Arrived at EDR: 10/21/2019
Date Made Active in Reports: 10/24/2019
Number of Days to Update: 3

Source: USGS
Telephone: 703-648-6533
Last EDR Contact: 05/27/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Varies

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historical Auto Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historical Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS: Recovered Government Archive State Hazardous Waste Facilities List

The EDR Recovered Government Archive State Hazardous Waste database provides a list of SHWS incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department Environmental Protection in Pennsylvania.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/30/2013
Number of Days to Update: 182

Source: Department Environmental Protection
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department Environmental Protection in Pennsylvania.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/10/2014
Number of Days to Update: 193

Source: Department Environmental Protection
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department Environmental Protection in Pennsylvania.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/30/2013
Number of Days to Update: 182

Source: Department Environmental Protection
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data

Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 05/08/2022
Date Data Arrived at EDR: 05/09/2022
Date Made Active in Reports: 07/28/2022
Number of Days to Update: 80

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 08/08/2022
Next Scheduled EDR Contact: 11/21/2022
Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2018
Date Data Arrived at EDR: 04/10/2019
Date Made Active in Reports: 05/16/2019
Number of Days to Update: 36

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 06/28/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data

Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 01/01/2019
Date Data Arrived at EDR: 10/29/2021
Date Made Active in Reports: 01/19/2022
Number of Days to Update: 82

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 07/29/2022
Next Scheduled EDR Contact: 11/07/2022
Data Release Frequency: Quarterly

RI MANIFEST: Manifest information

Hazardous waste manifest information

Date of Government Version: 12/31/2020
Date Data Arrived at EDR: 11/30/2021
Date Made Active in Reports: 02/18/2022
Number of Days to Update: 80

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 05/16/2022
Next Scheduled EDR Contact: 08/29/2022
Data Release Frequency: Annually

VT MANIFEST: Hazardous Waste Manifest Data

Hazardous waste manifest information.

Date of Government Version: 10/28/2019
Date Data Arrived at EDR: 10/29/2019
Date Made Active in Reports: 01/09/2020
Number of Days to Update: 72

Source: Department of Environmental Conservation
Telephone: 802-241-3443
Last EDR Contact: 07/12/2022
Next Scheduled EDR Contact: 10/24/2022
Data Release Frequency: Annually

WI MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 05/31/2018
Date Data Arrived at EDR: 06/19/2019
Date Made Active in Reports: 09/03/2019
Number of Days to Update: 76

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 06/03/2022
Next Scheduled EDR Contact: 09/19/2022
Data Release Frequency: Annually

Oil/Gas Pipelines

Source: Endeavor Business Media

Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by Endeavor Business Media. This information is provided on a best effort basis and Endeavor Business Media does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of Endeavor Business Media.

Electric Power Transmission Line Data

Source: Endeavor Business Media

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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:

Source: American Hospital Association, Inc.
Telephone: 312-280-5991

The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing

Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000

A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.
Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.
Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.
Daycare Centers: Child Care Facility List
Source: Department of Public Welfare
Telephone: 717-783-3856

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory
Source: Pennsylvania Spatial Data Access
Telephone: 610-344-6105

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

STREET AND ADDRESS INFORMATION

GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

IB BROWN ROAD STUDY AREA AND
2A GRIFFEY ROAD STUDY AREA
WEST SPRINGFIELD, PA 16443

TARGET PROPERTY COORDINATES

Latitude (North):	41.915099 - 41ˆ 54’ 54.36’’
Longitude (West):	80.484304 - 80ˆ 29’ 3.49’’
Universal Tranverse Mercator:	Zone 17
UTM X (Meters):	542766.7
UTM Y (Meters):	4640265.0
Elevation:	818 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	14042455 EAST SPRINGFIELD, PA
Version Date:	2019
West Map:	14438533 CONNEAUT, OH
Version Date:	2019

EDR’s GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

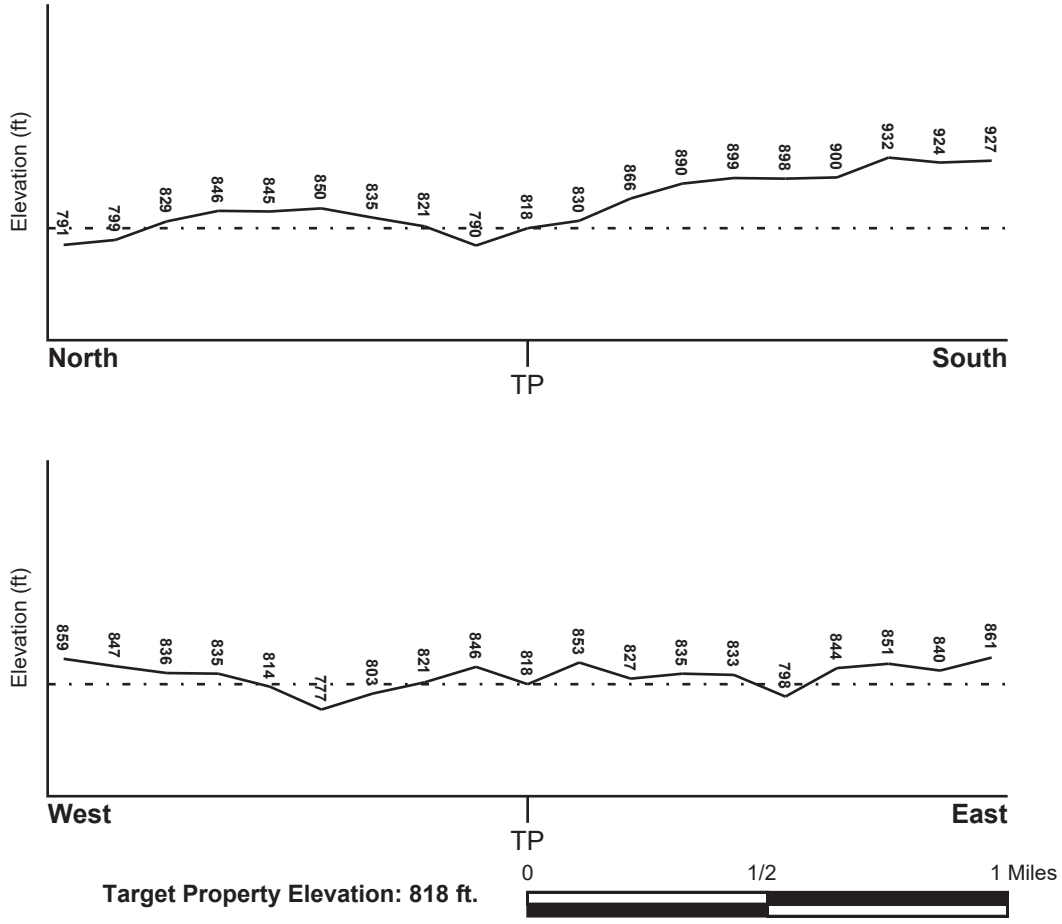
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General NNW

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Flood Plain Panel at Target Property	FEMA Source Type
42049C0315D	FEMA FIRM Flood data

Additional Panels in search area:	FEMA Source Type
42049C0295D	FEMA FIRM Flood data

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
EAST SPRINGFIELD	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

Era:	Paleozoic
System:	Devonian
Series:	Upper Devonian
Code:	D3 *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Stratified Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps. The following information is based on Soil Conservation Service STATSGO data.

Soil Component Name:	SHEFFIELD
Soil Surface Texture:	silt loam
Hydrologic Group:	Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.
Soil Drainage Class:	Poorly. Soils may have a saturated zone, a layer of low hydraulic conductivity, or seepage. Depth to water table is less than 1 foot.

Hydric Status: Soil meets the requirements for a hydric soil.

Corrosion Potential - Uncoated Steel:	HIGH
Depth to Bedrock Min:	> 60 inches
Depth to Bedrock Max:	> 60 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification			
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil	Permeability Rate (in/hr)	Soil Reaction (pH)
1	0 inches	8 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 2.00 Min: 0.60	Max: 5.50 Min: 4.50
2	8 inches	22 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.60 Min: 0.20	Max: 6.00 Min: 5.10
3	22 inches	41 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.06 Min: 0.00	Max: 7.30 Min: 5.60
4	41 inches	60 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.60 Min: 0.20	Max: 8.40 Min: 6.60

OTHER SOIL TYPES IN AREA

Based on Soil Conservation Service STATSGO data, the following additional subordinant soil types may appear within the general area of target property.

Soil Surface Textures: No Other Soil Types

Surficial Soil Types: No Other Soil Types

Shallow Soil Types: silty clay loam

Deeper Soil Types: stratified

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
B5	USGS40001039374	1/2 - 1 Mile East

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	PASI60000098205	1/4 - 1/2 Mile NNW
A2	PASI60000421002	1/2 - 1 Mile ESE
A3	PASI60000420449	1/2 - 1 Mile ESE
B4	PASI60000019044	1/2 - 1 Mile East
6	PASI60000096922	1/2 - 1 Mile SE
7	PASI60000098224	1/2 - 1 Mile ENE

OTHER STATE DATABASE INFORMATION

STATE OIL/GAS WELL INFORMATION

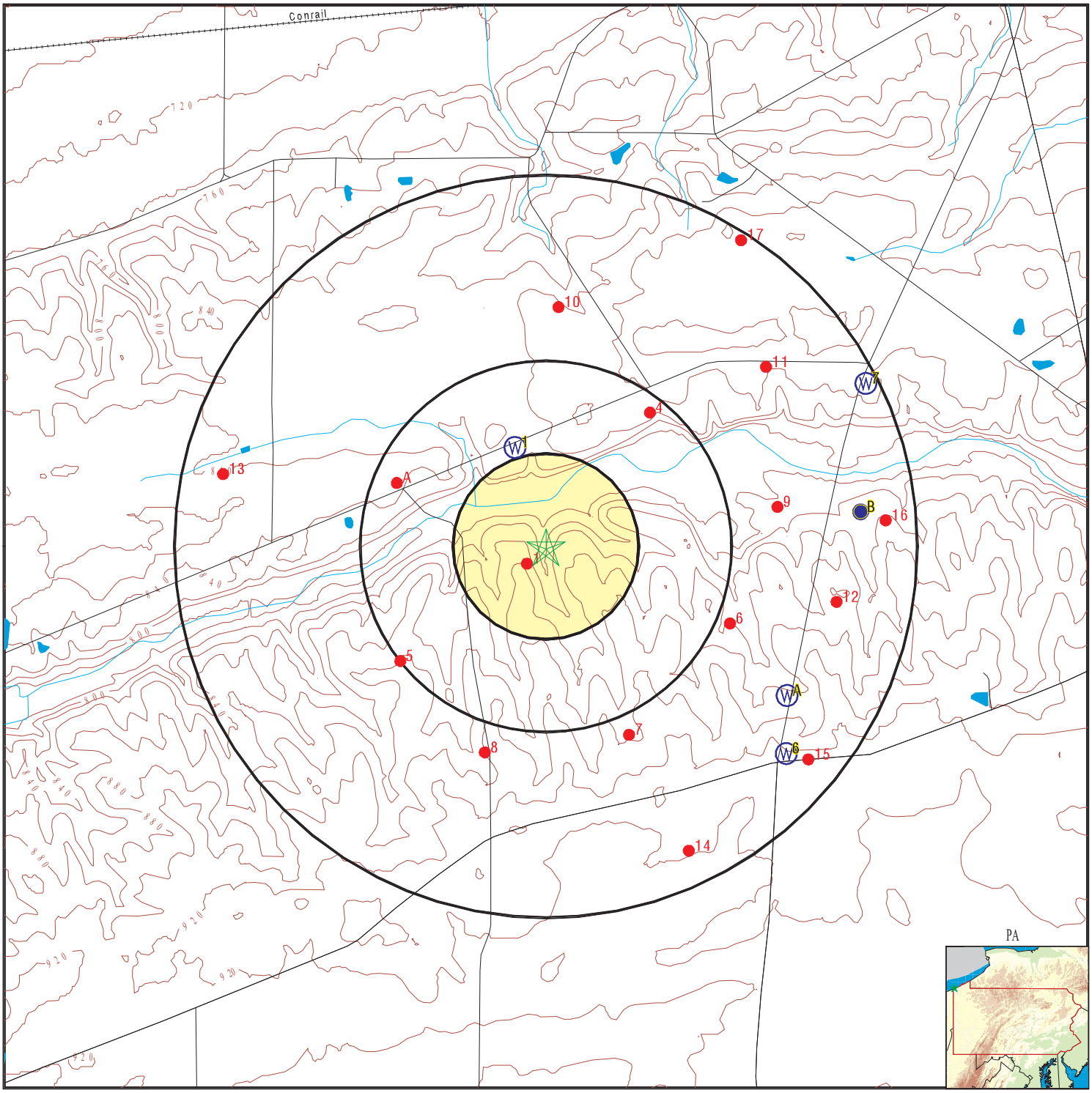
MAP ID	WELL ID	LOCATION FROM TP
1	PAOG80000075162	0 - 1/8 Mile SW
A2	PAOG80000005005	1/4 - 1/2 Mile WNW
A3	PAOG80000159065	1/4 - 1/2 Mile WNW
4	PAOG80000077262	1/4 - 1/2 Mile NE
5	PAOG80000135216	1/4 - 1/2 Mile SW
6	PAOG80000095804	1/2 - 1 Mile ESE
7	PAOG80000004820	1/2 - 1 Mile SSE
8	PAOG80000015944	1/2 - 1 Mile SSW
9	PAOG80000061899	1/2 - 1 Mile East
10	PAOG80000024070	1/2 - 1 Mile North
11	PAOG80000117580	1/2 - 1 Mile NE
12	PAOG80000028906	1/2 - 1 Mile East
13	PAOG80000095416	1/2 - 1 Mile WNW
14	PAOG80000042250	1/2 - 1 Mile SSE

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
15	PAOG80000064165	1/2 - 1 Mile SE
16	PAOG80000053018	1/2 - 1 Mile East
17	PAOG80000078498	1/2 - 1 Mile NNE

PHYSICAL SETTING SOURCE MAP - 7079489.2s



- County Boundary
- Major Roads
- Contour Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons
- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location
- Oil, gas or related wells

SITE NAME:	IB Brown Road Study Area and	CLIENT:	U.S. Army Corps of Engineers
ADDRESS:	2A Griffey Road Study Area West Springfield PA 16443	CONTACT:	Martin Jander
LAT/LONG:	41.915099 / 80.484304	INQUIRY #:	7079489.2s
		DATE:	August 10, 2022 4:51 pm

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

1
NNW
1/4 - 1/2 Mile
Higher

PA WELLS **PASI60000098205**

Database:	Pennsylvania Groundwater Information System		
GWIS ID:	98309	Local Well #:	1784N
Aquifer:	CHADAKOIN FORMATION	Topography:	Hillside
Well Depth:	80	Elevation:	0
Site Type:	W	Depth to Bedrock:	29
Saltwater Zone:	0	Date Drilled:	01-MAY-80
Local Permit #:	Not Reported		
Owner ID:	97605	Ownership Date:	Not Reported
Construction Date:	01-MAY-80	Driller:	1094
Source of Construction Data:	DRILLERS RECORD	Construction Method:	Not Reported
How Finished:	Unsuppored (Uncased) Borehole		
Driller Well ID:	Not Reported	Reason Abandoned:	Not Reported
Construction Type:	New Well	Original Driller Name:	Not Reported
Discharge Type:	Unknown	Data Source:	DRILLERS RECORD
Discharge Measurement Method:	Bailer	Discharge:	1.
Static Water Level (ft):	24.	Agency Providing Data:	Drillers Record
WL Measurement Method:	REPORTED, METHOD NOT KNOWN		
Production Water Level (ft):	70.	Drawdown (ft):	46.
Yield (gmp/ft):	Not Reported	Test Length (min):	4.
SiteStatus at Test:	Not Reported	Date Discharged:	01-MAY-80
Lithology:	UNKNOWN	Contributing Unit:	Primary
Top of Interval:	Not Reported	Bottom of Interval:	Not Reported
Site Use:	WITHDRAWAL	Date of Use:	Not Reported
Water Use:	DOMESTIC	Notes:	Not Reported

A2
ESE
1/2 - 1 Mile
Higher

PA WELLS **PASI60000421002**

Database:	Pennsylvania Groundwater Information System		
GWIS ID:	0	Local Well #:	Not Reported
Aquifer:	Not Reported	Topography:	Not Reported
Well Depth:	80	Elevation:	0
Site Type:	W	Depth to Bedrock:	55
Saltwater Zone:	0	Date Drilled:	30-MAY-14
Local Permit #:	Not Reported		
Owner ID:	7484304	Ownership Date:	Not Reported

Discharge Type:	Not Reported	Data Source:	Not Reported
Discharge Measurement Method:	Voumetric, Watch and Bucket		
Discharge:	1.	Static Water Level (ft):	16.
Agency Providing Data:	Not Reported	WL Measurement Method:	Not Reported
Production Water Level (ft):	80.	Drawdown (ft):	Not Reported
Yield (gmp/ft):	Not Reported	Test Length (min):	60.
SiteStatus at Test:	Not Reported	Date Discharged:	Not Reported
Site Use:	WITHDRAWAL	Date of Use:	Not Reported
Water Use:	DOMESTIC	Notes:	Not Reported

A3
ESE
1/2 - 1 Mile
Higher

PA WELLS **PASI60000420449**

Database:	Pennsylvania Groundwater Information System		
GWIS ID:	0	Local Well #:	Not Reported
Aquifer:	Not Reported	Topography:	Not Reported
Well Depth:	80	Elevation:	0
Site Type:	W	Depth to Bedrock:	54
Saltwater Zone:	0	Date Drilled:	14-MAY-14
Local Permit #:	Not Reported		
Owner ID:	7483822	Ownership Date:	Not Reported
Discharge Type:	Not Reported	Data Source:	Not Reported
Discharge Measurement Method:	Bailer	Discharge:	0.
Static Water Level (ft):	22.	Agency Providing Data:	Not Reported
WL Measurement Method:	Not Reported	Production Water Level (ft):	80.
Drawdown (ft):	Not Reported	Yield (gmp/ft):	Not Reported
Test Length (min):	30.	SiteStatus at Test:	Not Reported
Date Discharged:	Not Reported		
Site Use:	WITHDRAWAL	Date of Use:	Not Reported
Water Use:	DOMESTIC	Notes:	Not Reported

Comments: Well Is Low Yield. Will Fill To Static Level Overnight.

B4
East
1/2 - 1 Mile
Higher

PA WELLS **PASI60000019044**

Database:	Pennsylvania Groundwater Information System		
GWIS ID:	19046	Local Well #:	ER 1244
Aquifer:	GLACIAL OUTWASH	Topography:	Hillside
Well Depth:	48	Elevation:	825
Site Type:	W	Depth to Bedrock:	0
Saltwater Zone:	0	Date Drilled:	24-AUG-56
Local Permit #:	Not Reported		

Owner ID:	18989	Ownership Date:	24-AUG-56
Construction Date:	24-AUG-56	Driller:	0410
Source of Construction Data:	DRILLERS RECORD	Construction Method:	Cable Tool
How Finished:	Entire Length Cased, Open End		
Driller Well ID:	Not Reported	Reason Abandoned:	Not Reported
Construction Type:	Not Reported	Original Driller Name:	Not Reported
Discharge Type:	Pumped	Data Source:	DRILLERS RECORD
Discharge Measurement Method:	Bailer	Discharge:	10.
Static Water Level (ft):	25.	Agency Providing Data:	Drillers Record
WL Measurement Method:	STEEL TAPE	Production Water Level (ft):	Not Reported
Drawdown (ft):	Not Reported	Yield (gmp/ft):	Not Reported
Test Length (min):	Not Reported	SiteStatus at Test:	Not Reported
Date Discharged:	24-AUG-56		
Lithology:	GRAVEL	Contributing Unit:	Primary
Top of Interval:	Not Reported	Bottom of Interval:	Not Reported
Site Use:	WITHDRAWAL	Date of Use:	Not Reported
Water Use:	DOMESTIC	Notes:	Not Reported
Agency Site Use:	Inventory Data Site Only	Agency Use Date:	Not Reported

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B5
East
1/2 - 1 Mile
Higher

FED USGS **USGS40001039374**

Organization ID:	USGS-PA		
Organization Name:	USGS Pennsylvania Water Science Center		
Monitor Location:	ER 1244	Type:	Well
Description:	Not Reported	HUC:	04120101
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Sand and gravel aquifers (glaciated regions)		
Formation Type:	Outwash	Aquifer Type:	Not Reported
Construction Date:	19560824	Well Depth:	48
Well Depth Units:	ft	Well Hole Depth:	48
Well Hole Depth Units:	ft		
Ground water levels,Number of Measurements:	1	Level reading date:	1956-08-24
Feet below surface:	25	Feet to sea level:	Not Reported
Note:	Not Reported		

6
SE
1/2 - 1 Mile
Higher

PA WELLS **PASI60000096922**

Database:	Pennsylvania Groundwater Information System		
GWIS ID:	97025	Local Well #:	1331N

Aquifer:	CHADAKOIN FORMATION	Topography:	Hillside
Well Depth:	85	Elevation:	0
Site Type:	W	Depth to Bedrock:	7
Saltwater Zone:	0	Date Drilled:	01-JUL-84
Local Permit #:	Not Reported		
Owner ID:	96323	Ownership Date:	Not Reported
Construction Date:	01-JUL-84	Driller:	1209
Source of Construction Data:	DRILLERS RECORD	Construction Method:	Not Reported
How Finished:	Entire Length Cased, Some Sections Perforated/Slotted		
Driller Well ID:	Not Reported	Reason Abandoned:	Not Reported
Construction Type:	New Well	Original Driller Name:	Not Reported
Discharge Type:	Unknown	Data Source:	DRILLERS RECORD
Discharge Measurement Method:	Voumetric, Watch and Bucket		
Discharge:	20.	Static Water Level (ft):	50.
Agency Providing Data:	Drillers Record	WL Measurement Method:	REPORTED, METHOD NOT KNOWN
Production Water Level (ft):	60.	Drawdown (ft):	10.
Yield (gmp/ft):	Not Reported	Test Length (min):	10.
SiteStatus at Test:	Not Reported	Date Discharged:	01-JUL-84
Lithology:	UNKNOWN	Contributing Unit:	Primary
Top of Interval:	Not Reported	Bottom of Interval:	Not Reported
Site Use:	WITHDRAWAL	Date of Use:	Not Reported
Water Use:	DOMESTIC	Notes:	Not Reported

7
ENE
1/2 - 1 Mile
Higher

PA WELLS **PASI60000098224**

Database:	Pennsylvania Groundwater Information System		
GWIS ID:	98328	Local Well #:	X 1259
Aquifer:	CONNEAUT FORMATION	Topography:	Not Reported
Well Depth:	93	Elevation:	0
Site Type:	W	Depth to Bedrock:	0
Saltwater Zone:	0	Date Drilled:	Not Reported
Local Permit #:	Not Reported		
Owner ID:	97623	Ownership Date:	Not Reported
Construction Date:	Not Reported	Driller:	1197
Source of Construction Data:	DRILLERS RECORD	Construction Method:	Not Reported
How Finished:	Unsuppored (Uncased) Borehole		
Driller Well ID:	Not Reported	Reason Abandoned:	Not Reported
Construction Type:	New Well	Original Driller Name:	Not Reported
Discharge Type:	Unknown	Data Source:	DRILLERS RECORD
Discharge Measurement Method:	Unknown	Discharge:	22.

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Static Water Level (ft):	53.	Agency Providing Data:	Drillers Record
WL Measurement Method:	REPORTED, METHOD NOT KNOWN		
Production Water Level (ft):	Not Reported	Drawdown (ft):	Not Reported
Yield (gmp/ft):	Not Reported	Test Length (min):	30.
SiteStatus at Test:	Not Reported	Date Discharged:	Not Reported
Lithology:	Not Reported	Contributing Unit:	Primary
Top of Interval:	Not Reported	Bottom of Interval:	Not Reported
Site Use:	WITHDRAWAL	Date of Use:	Not Reported
Water Use:	DOMESTIC	Notes:	Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance

Database EDR ID Number

1
SW
0 - 1/8 Mile

OIL_GAS **PAOG80000075162**

Organization:	GREENRIDGE OIL CO LLC	Client ID:	284218
Client:	GREENRIDGE OIL CO LLC	Site ID:	547442
Site Name:	HAHN 1 OG WELL	Primary Facility ID:	565504
Primary Facility:	HAHN 1	Sub Facility ID:	555965
Sub Facility:	HAHN 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

A2
WNW
1/4 - 1/2 Mile

OIL_GAS **PAOG80000005005**

Organization:	MIDTERRA ASSOC INC	Client ID:	45359
Client:	MIDTERRA ASSOC INC	Site ID:	35919
Site Name:	RA KING 1 OG WELL	Primary Facility ID:	37671
Primary Facility:	RA KING 1	Sub Facility ID:	1054585
Sub Facility:	RA KING 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

A3
WNW
1/4 - 1/2 Mile

OIL_GAS **PAOG80000159065**

Organization:	MIDTERRA ASSOC INC	Client ID:	45359
Client:	MIDTERRA ASSOC INC	Site ID:	35919
Site Name:	RA KING 1 OG WELL	Primary Facility ID:	37671
Primary Facility:	RA KING 1	Sub Facility ID:	51201
Sub Facility:	RA KING 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

4
NE
1/4 - 1/2 Mile

OIL_GAS **PAOG80000077262**

Organization:	GREENRIDGE OIL CO LLC	Client ID:	284218
Client:	GREENRIDGE OIL CO LLC	Site ID:	35855
Site Name:	WELDON 1OG WELL	Primary Facility ID:	37607
Primary Facility:	WELDON 1	Sub Facility ID:	51137
Sub Facility:	WELDON 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance

Database EDR ID Number

5
SW
1/4 - 1/2 Mile

OIL_GAS **PAOG80000135216**

Organization:	GREENRIDGE OIL CO LLC	Client ID:	284218
Client:	GREENRIDGE OIL CO LLC	Site ID:	35789
Site Name:	ROBERT L & IJ BLOOD 1 OG WELL	Primary Facility ID:	37541
Primary Facility:	ROBERT L & IJ BLOOD 1	Sub Facility ID:	51071
Sub Facility:	ROBERT L & IJ BLOOD 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

6
ESE
1/2 - 1 Mile

OIL_GAS **PAOG80000095804**

Organization:	Unavailable	Client ID:	47941
Client:	REX DRUMMOND	Site ID:	36017
Site Name:	PHILLIP PATTEN 1 OG WELL	Primary Facility ID:	37769
Primary Facility:	PHILLIP PATTEN 1	Sub Facility ID:	51299
Sub Facility:	PHILLIP PATTEN 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	NO

7
SSE
1/2 - 1 Mile

OIL_GAS **PAOG80000004820**

Organization:	GREENRIDGE OIL CO LLC	Client ID:	284218
Client:	GREENRIDGE OIL CO LLC	Site ID:	35848
Site Name:	JL WHITE MAVROS 1 OG WELL	Primary Facility ID:	37600
Primary Facility:	JL WHITE MAVROS 1	Sub Facility ID:	51130
Sub Facility:	JL WHITE MAVROS 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

8
SSW
1/2 - 1 Mile

OIL_GAS **PAOG80000015944**

Organization:	GREENRIDGE OIL CO LLC	Client ID:	284218
Client:	GREENRIDGE OIL CO LLC	Site ID:	35831
Site Name:	RL & RJ BLOOD RL BLOOD 2 OG WELL	Primary Facility ID:	37583
Primary Facility:	RL & RJ BLOOD RL BLOOD 2	Sub Facility ID:	51113
Sub Facility:	RL & RJ BLOOD RL BLOOD 2	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance

Database EDR ID Number

9
East
1/2 - 1 Mile

OIL_GAS **PAOG80000061899**

Organization:	Unavailable	Client ID:	47941
Client:	REX DRUMMOND	Site ID:	36031
Site Name:	J & A BLOOD 1 OG WELL	Primary Facility ID:	37783
Primary Facility:	J & A BLOOD 1	Sub Facility ID:	51313
Sub Facility:	J & A BLOOD 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

10
North
1/2 - 1 Mile

OIL_GAS **PAOG80000024070**

Organization:	MIDTERRA ASSOC INC	Client ID:	45359
Client:	MIDTERRA ASSOC INC	Site ID:	35901
Site Name:	WK HOPKINS 1 OG WELL	Primary Facility ID:	37653
Primary Facility:	WK HOPKINS 1	Sub Facility ID:	51183
Sub Facility:	WK HOPKINS 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Inactive	Compliance:	YES

11
NE
1/2 - 1 Mile

OIL_GAS **PAOG80000117580**

Organization:	GREENRIDGE OIL CO LLC	Client ID:	284218
Client:	GREENRIDGE OIL CO LLC	Site ID:	35905
Site Name:	HAROLD THAYER 1 OG WELL	Primary Facility ID:	37657
Primary Facility:	HAROLD THAYER 1	Sub Facility ID:	51187
Sub Facility:	HAROLD THAYER 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

12
East
1/2 - 1 Mile

OIL_GAS **PAOG80000028906**

Organization:	Unavailable	Client ID:	47941
Client:	REX DRUMMOND	Site ID:	36019
Site Name:	J & M FREEMAN 1 OG WELL	Primary Facility ID:	37771
Primary Facility:	J & M FREEMAN 1	Sub Facility ID:	51301
Sub Facility:	J & M FREEMAN 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

Map ID
Direction
Distance

Database EDR ID Number

13
WNW
1/2 - 1 Mile

OIL_GAS **PAOG80000095416**

Organization:	SHELEX DRILLING INC	Client ID:	48671
Client:	SHELEX DRILLING INC	Site ID:	40305
Site Name:	J KONOPA JR 1 OG WELL	Primary Facility ID:	42057
Primary Facility:	J KONOPA JR 1	Sub Facility ID:	55587
Sub Facility:	J KONOPA JR 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

14
SSE
1/2 - 1 Mile

OIL_GAS **PAOG80000042250**

Organization:	GREENRIDGE OIL CO LLC	Client ID:	284218
Client:	GREENRIDGE OIL CO LLC	Site ID:	35829
Site Name:	B GRIFFEY 1 OG WELL	Primary Facility ID:	37581
Primary Facility:	B GRIFFEY 1	Sub Facility ID:	51111
Sub Facility:	B GRIFFEY 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

15
SE
1/2 - 1 Mile

OIL_GAS **PAOG80000064165**

Organization:	GREENRIDGE OIL CO LLC	Client ID:	284218
Client:	GREENRIDGE OIL CO LLC	Site ID:	35844
Site Name:	B GRIFFEY 2 OG WELL	Primary Facility ID:	37596
Primary Facility:	B GRIFFEY 2	Sub Facility ID:	51126
Sub Facility:	B GRIFFEY 2	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

16
East
1/2 - 1 Mile

OIL_GAS **PAOG80000053018**

Organization:	Unavailable	Client ID:	47941
Client:	REX DRUMMOND	Site ID:	36032
Site Name:	J & M FREEMAN 2 OG WELL	Primary Facility ID:	37784
Primary Facility:	J & M FREEMAN 2	Sub Facility ID:	51314
Sub Facility:	J & M FREEMAN 2	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	NO

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance

Database EDR ID Number

17
NNE
1/2 - 1 Mile

OIL_GAS **PAOG80000078498**

Organization:	GREENRIDGE OIL CO LLC	Client ID:	284218
Client:	GREENRIDGE OIL CO LLC	Site ID:	707286
Site Name:	PORTER 1 OG WELL	Primary Facility ID:	707609
Primary Facility:	PORTER 1	Sub Facility ID:	970987
Sub Facility:	PORTER 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: PA Radon

Radon Test Results

Zipcode	Num Tests	Min pCi/L	Max pCi/L	Avg pCi/L
16443	27	0.5	38.4	3.6

EPA Region 3 Statistical Summary Readings for Zip Code: 16443

Number of sites tested: 5.

Maximum Radon Level: 8.2 pCi/L.
Minimum Radon Level: 1.8 pCi/L.

pCi/L <4	pCi/L 4-10	pCi/L 10-20	pCi/L 20-50	pCi/L 50-100	pCi/L >100
2 (40.00%)	3 (60.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)

Federal EPA Radon Zone for ERIE County: 2

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory
Source: Pennsylvania Spatial Data Access
Telephone: 610-344-6105

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Pennsylvania Groundwater Information System
Source: Department of Conservation and Natural Resources
Telephone: 717-702-2045

OTHER STATE DATABASE INFORMATION

Pennsylvania Oil and Gas Locations
Source: Pennsylvania Department of Environmental Protection
Telephone: 814-863-0104
An Oil and Gas Location is a DEP primary facility type related to the Oil & Gas Program. The sub-facility types related to Oil and Gas that are included in this layer are:Land Application -- An area where drilling cuttings or waste are disposed by land application; Well-- A well associated with oil and/or gas production; Pit -- An approved pit that is used for storage of oil and gas well fluids. Some sub facility types are not included in this layer due to security policies.

RADON

State Database: PA Radon
Source: Department of Environmental Protection
Telephone: 717-783-3594
Radon Test Results Statistics by Zip Code

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

EPA Region 3 Statistical Summary Readings
Source: Region 3 EPA
Telephone: 215-814-2082
Radon readings for Delaware, D.C., Maryland, Pennsylvania, Virginia and West Virginia.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary faultlines, prepared in 1975 by the United State Geological Survey

STREET AND ADDRESS INFORMATION

Appendix B

Aerial Photographs

IB Brown Road Study Area and

2A Griffey Road Study Area

West Springfield, PA 16443

Inquiry Number: 7079489.8

August 15, 2022

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

08/15/22

Site Name:

IB Brown Road Study Area anc
2A Griffey Road Study Area
West Springfield, PA 16443
EDR Inquiry # 7079489.8

Client Name:

U.S. Army Corps of Engineers
1776 Niagra Street
Buffalo, NY 142073199
Contact: Martin Jander

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

Year	Scale	Details	Source
2017	1"=1000'	Flight Year: 2017	USDA/NAIP
2013	1"=1000'	Flight Year: 2013	USDA/NAIP
2010	1"=1000'	Flight Year: 2010	USDA/NAIP
2006	1"=1000'	Flight Year: 2006	USDA/NAIP
2002	1"=1000'	Flight Date: May 04, 2002	USGS
1993	1"=1000'	Acquisition Date: April 27, 1993	USGS/DOQQ
1983	1"=1000'	Flight Date: May 11, 1983	USDA
1977	1"=1000'	Flight Date: June 04, 1977	USGS
1968	1"=1000'	Flight Date: October 30, 1968	USDA
1960	1"=1000'	Flight Date: June 08, 1960	USGS
1959	1"=1000'	Flight Date: August 02, 1959	USDA
1956	1"=1000'	Flight Date: October 29, 1956	USGS
1938	1"=1000'	Flight Date: September 25, 1938	USDA

When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.


INQUIRY #: 7079489.8
YEAR: 2017
= 1000'
N
EDR


INQUIRY #: 7079489.8
YEAR: 2013
= 1000'
N
EDR


INQUIRY #: 7079489.8
YEAR: 2010
= 1000'
N
EDR


INQUIRY #: 7079489.8
YEAR: 2006
= 1000'
N
EDR

INQUIRY #: 7079489.8

YEAR: 2002

= 1000'

N

EDR


INQUIRY #: 7079489.8
YEAR: 1993
= 1000'
N
EDR


INQUIRY #: 7079489.8
YEAR: 1983
= 1000'
N
EDR

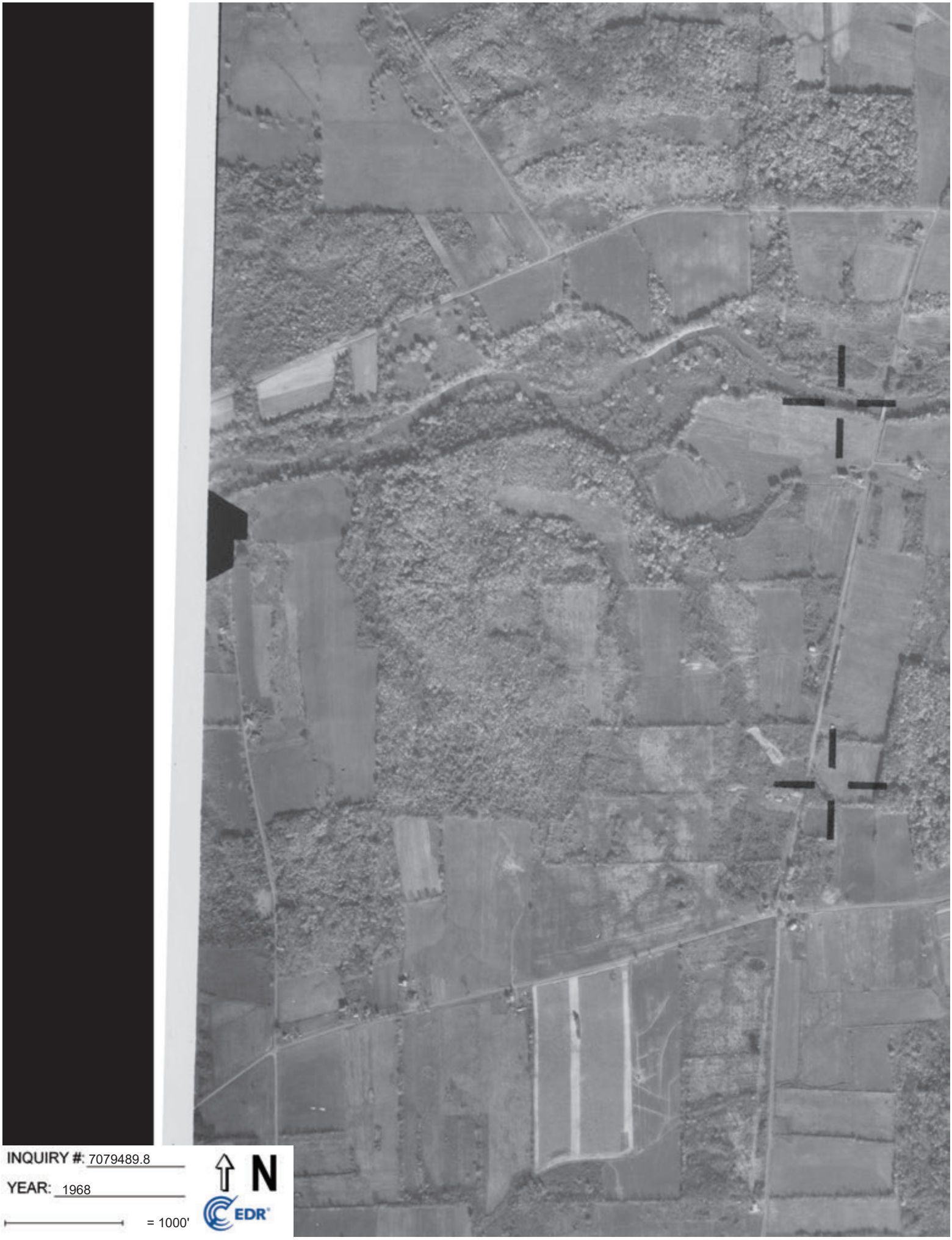
INQUIRY #: 7079489.8

YEAR: 1977

= 1000'

N

EDR



INQUIRY #: 7079489.8

YEAR: 1968

= 1000'

N

EDR


INQUIRY #: 7079489.8
YEAR: 1960
= 1000'
N
EDR

INQUIRY #: 7079489.8

YEAR: 1959

= 1000'

N

EDR


INQUIRY #: 7079489.8
YEAR: 1956
= 1000'
N
EDR

INQUIRY #: 7079489.8

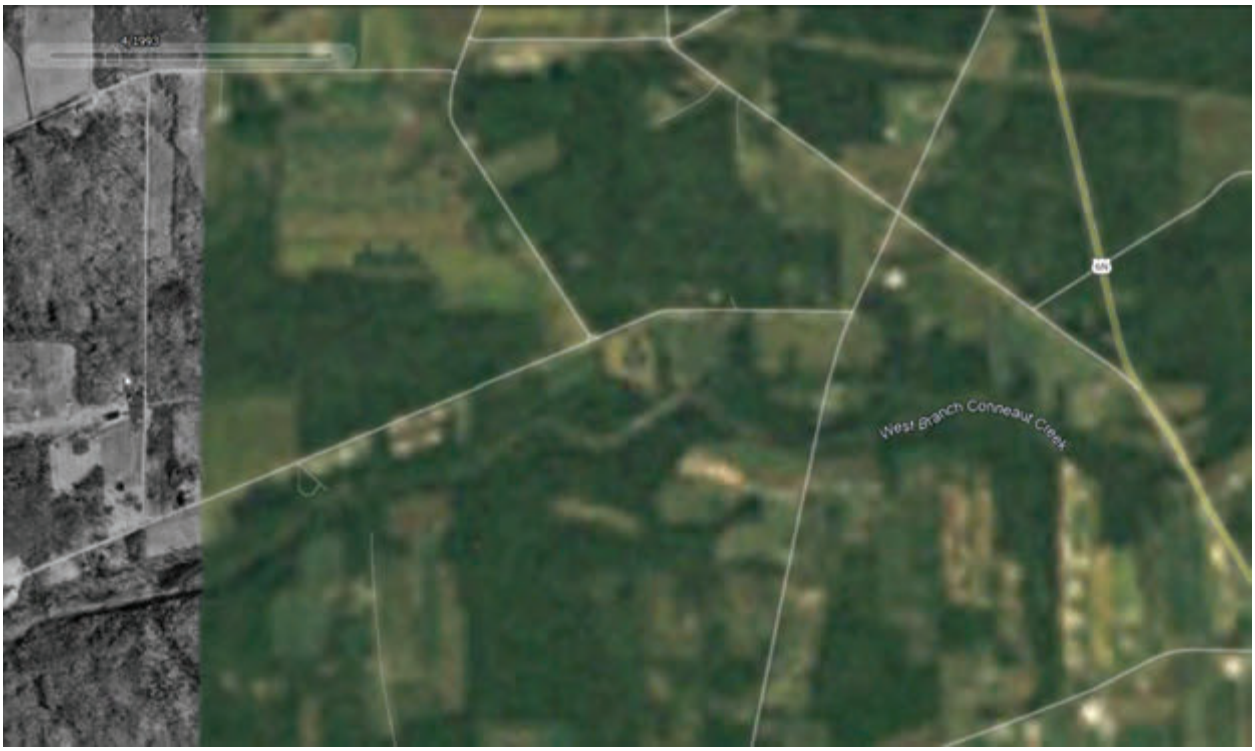
YEAR: 1938

= 1000'

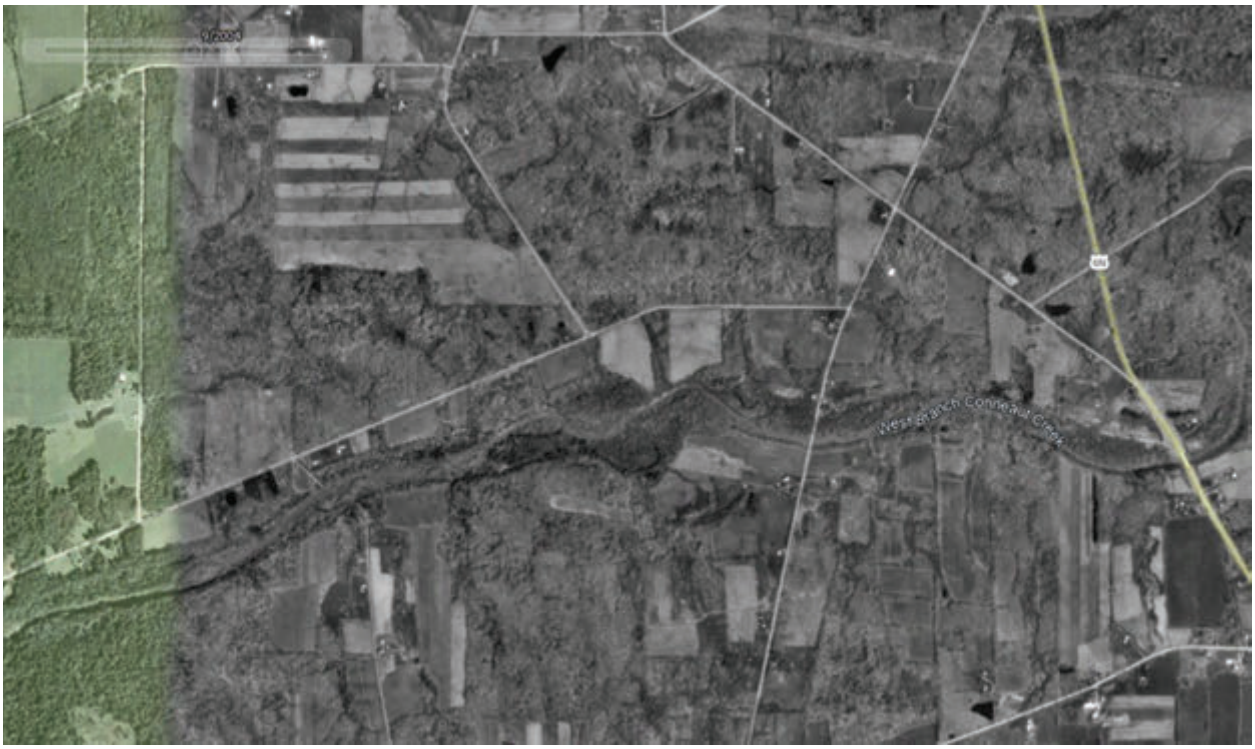
N

EDR

1985



1993



2004

2005

2006

2008

2009

2010

2011

2012

2014

2015

2016

2019

2021

Appendix C

Fire Insurance Maps

IB Brown Road Study Area and
2A Griffey Road Study Area
West Springfield, PA 16443

Inquiry Number: 7079489.3
August 10, 2022

Certified Sanborn® Map Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

08/10/22

Site Name:

IB Brown Road Study Area anc
2A Griffey Road Study Area
West Springfield, PA 16443
EDR Inquiry # 7079489.3

Client Name:

U.S. Army Corps of Engineers
1776 Niagra Street
Buffalo, NY 142073199
Contact: Martin Jander

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by U.S. Army Corps of Engineers were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Certification # 08C0-4178-BF8C

PO # NA

Project Conneaut Sea Lamprey Barrier

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

Sanborn® Library search results

Certification #: 08C0-4178-BF8C

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ☑ Library of Congress
- ☑ University Publications of America
- ☑ EDR Private Collection

The Sanborn Library LLC Since 1866™

Limited Permission To Make Copies

U.S. Army Corps of Engineers (the client) is permitted to make up to FIVE photocopies of this Sanborn Map transmittal and each fire insurance map accompanying this report solely for the limited use of its customer. No one other than the client is authorized to make copies. Upon request made directly to an EDR Account Executive, the client may be permitted to make a limited number of additional photocopies. This permission is conditioned upon compliance by the client, its customer and their agents with EDR's copyright policy; a copy of which is available upon request.

Appendix D

Historical Topographic Maps

IB Brown Road Study Area and
2A Griffey Road Study Area
West Springfield, PA 16443

Inquiry Number: 7079489.4
August 10, 2022

EDR Historical Topo Map Report

with QuadMatch™

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topo Map Report

08/10/22

Site Name:

IB Brown Road Study Area anc
2A Griffey Road Study Area
West Springfield, PA 16443
EDR Inquiry # 7079489.4

Client Name:

U.S. Army Corps of Engineers
1776 Niagra Street
Buffalo, NY 142073199
Contact: Martin Jander

EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by U.S. Army Corps of Engineers were identified for the years listed below. EDR's Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

Search Results:

P.O.# NA

Project: Conneaut Sea Lamprey Barrier

Coordinates:

Latitude:	41.915099 41° 54' 54" North
Longitude:	-80.484304 -80° 29' 3" West
UTM Zone:	Zone 17 North
UTM X Meters:	542765.50
UTM Y Meters:	4640478.40
Elevation:	821.07' above sea level

Maps Provided:

2019
2016
2013
1990
1977
1969, 1970
1959, 1960
1900

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2019 Source Sheets

East Springfield

7.5-minute, 24000

Conneaut

7.5-minute, 24000

2016 Source Sheets

East Springfield

7.5-minute, 24000

Conneaut

7.5-minute, 24000

2013 Source Sheets

East Springfield

7.5-minute, 24000

Conneaut

7.5-minute, 24000

1990 Source Sheets

East Springfield

7.5-minute, 24000
Aerial Photo Revised 1987

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1977 Source Sheets

East Springfield

7.5-minute, 24000
Aerial Photo Revised 1969

1969, 1970 Source Sheets

East Springfield

7.5-minute, 24000
Aerial Photo Revised 1969

Conneaut

7.5-minute, 24000
Aerial Photo Revised 1970

1959, 1960 Source Sheets

East Springfield

7.5-minute, 24000
Aerial Photo Revised 1957

Conneaut

7.5-minute, 24000
Aerial Photo Revised 1958

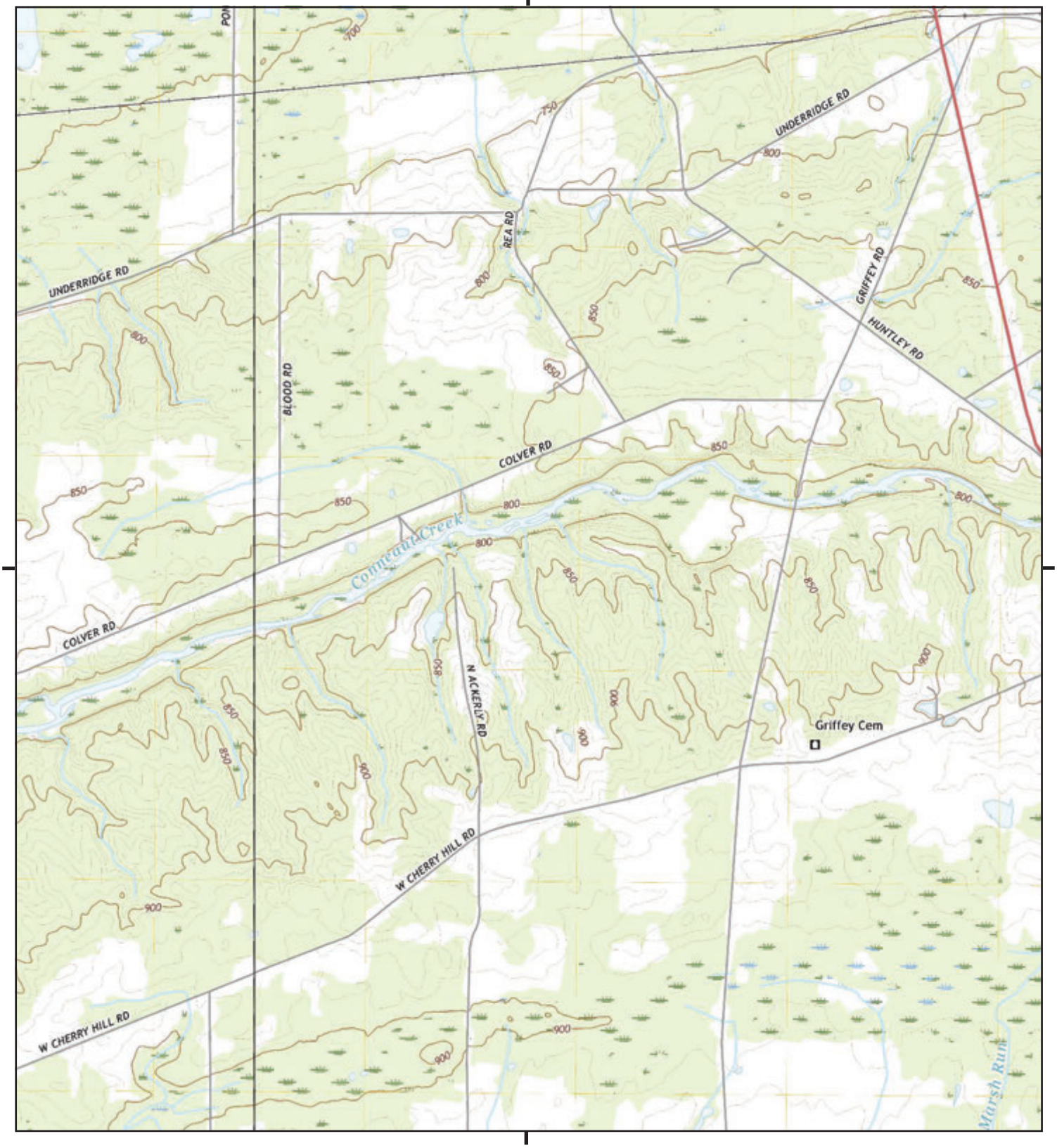
1900 Source Sheets

Girard

15-minute, 62500

Historical Topo Map

2019



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

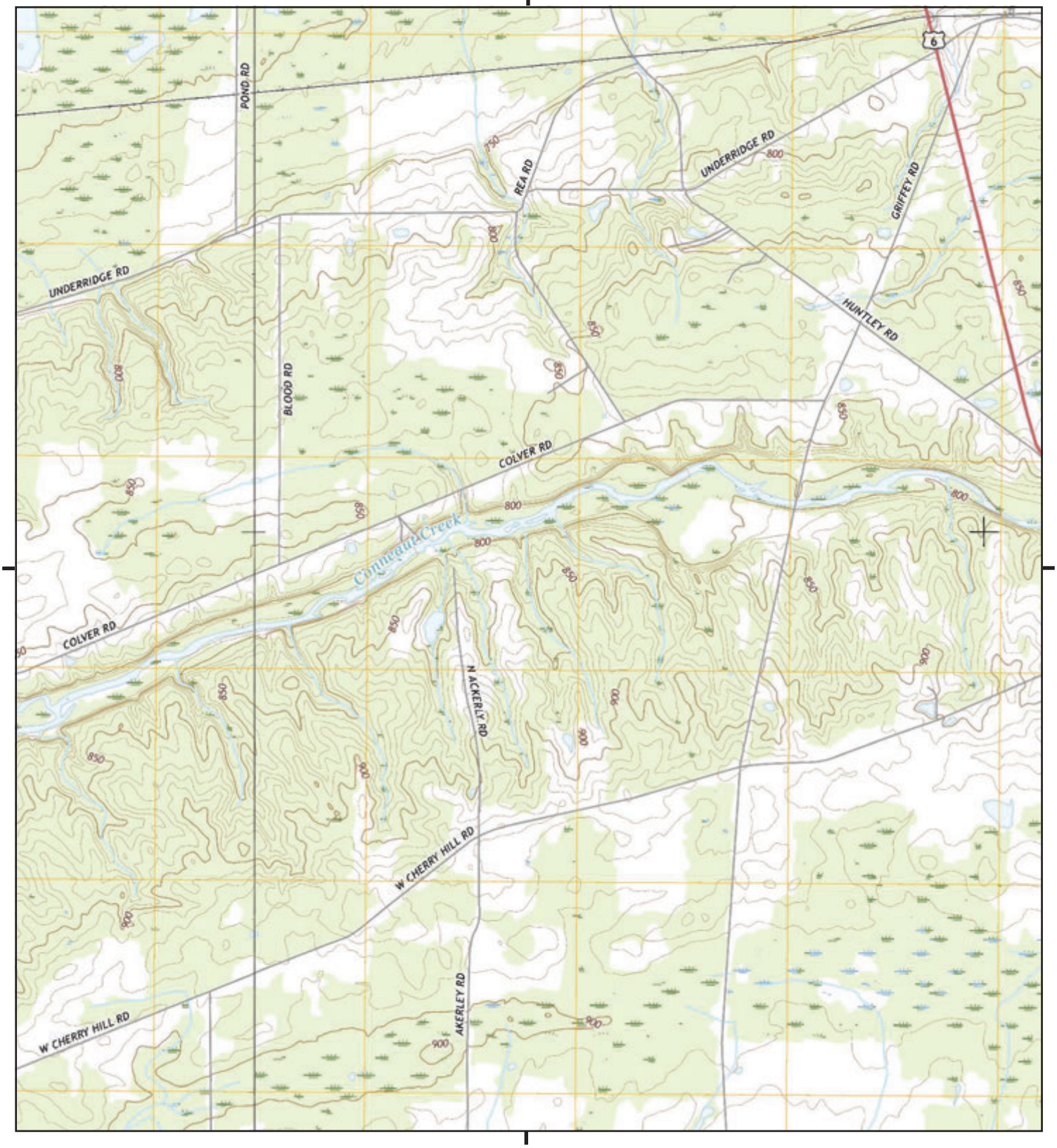
TP, East Springfield, 2019, 7.5-minute
W, Conneaut, 2019, 7.5-minute

SITE NAME: IB Brown Road Study Area and
ADDRESS: 2A Griffey Road Study Area
West Springfield, PA 16443
CLIENT: U.S. Army Corps of Engineers

N

Historical Topo Map

2016



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

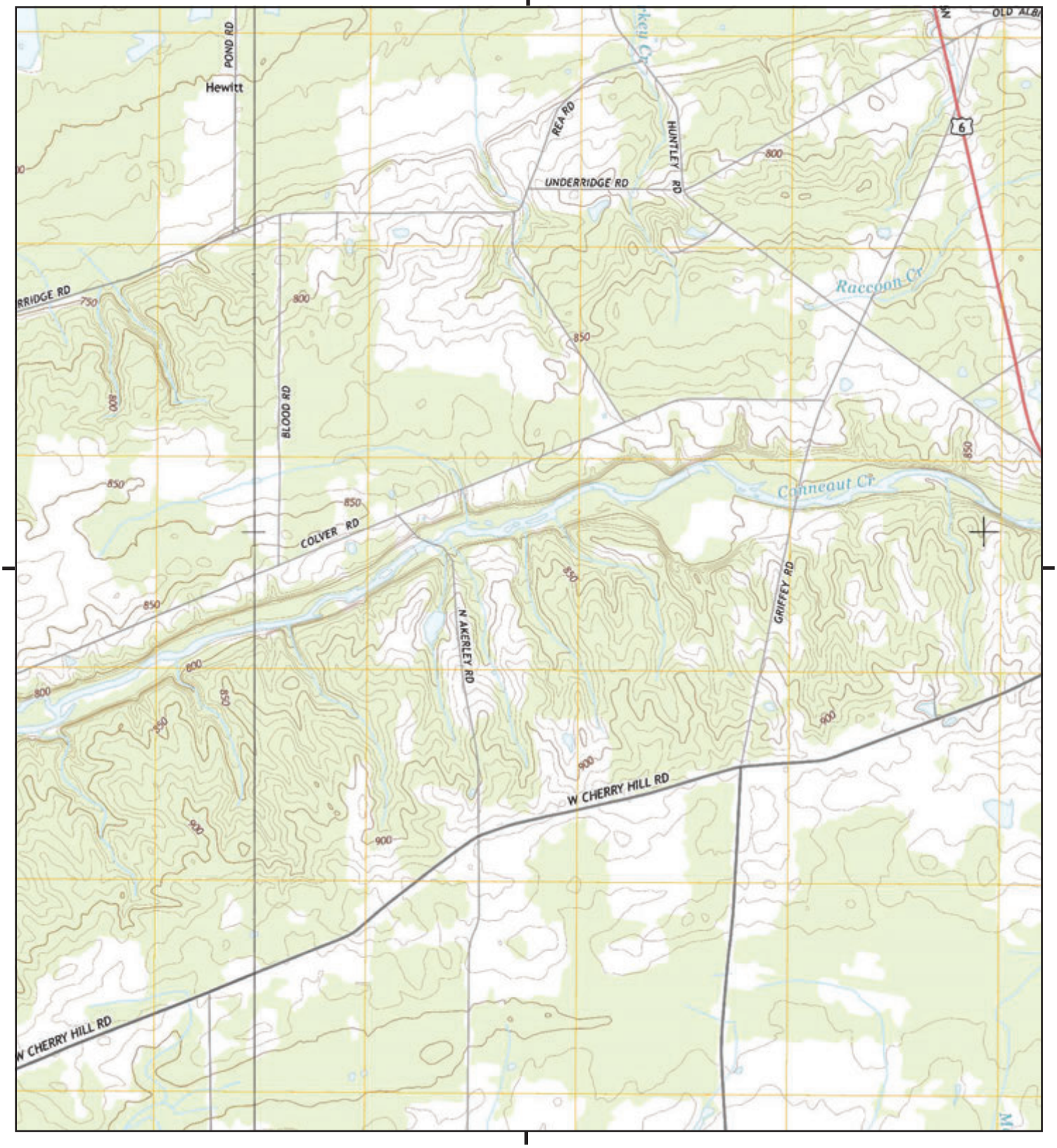
TP, East Springfield, 2016, 7.5-minute
W, Conneaut, 2016, 7.5-minute

SITE NAME: IB Brown Road Study Area and
ADDRESS: 2A Griffey Road Study Area
West Springfield, PA 16443
CLIENT: U.S. Army Corps of Engineers

N

Historical Topo Map

2013



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, East Springfield, 2013, 7.5-minute
W, Conneaut, 2013, 7.5-minute

SITE NAME: IB Brown Road Study Area and
ADDRESS: 2A Griffey Road Study Area
West Springfield, PA 16443
CLIENT: U.S. Army Corps of Engineers

N

Historical Topo Map

1990

This report includes information from the following map sheet(s).

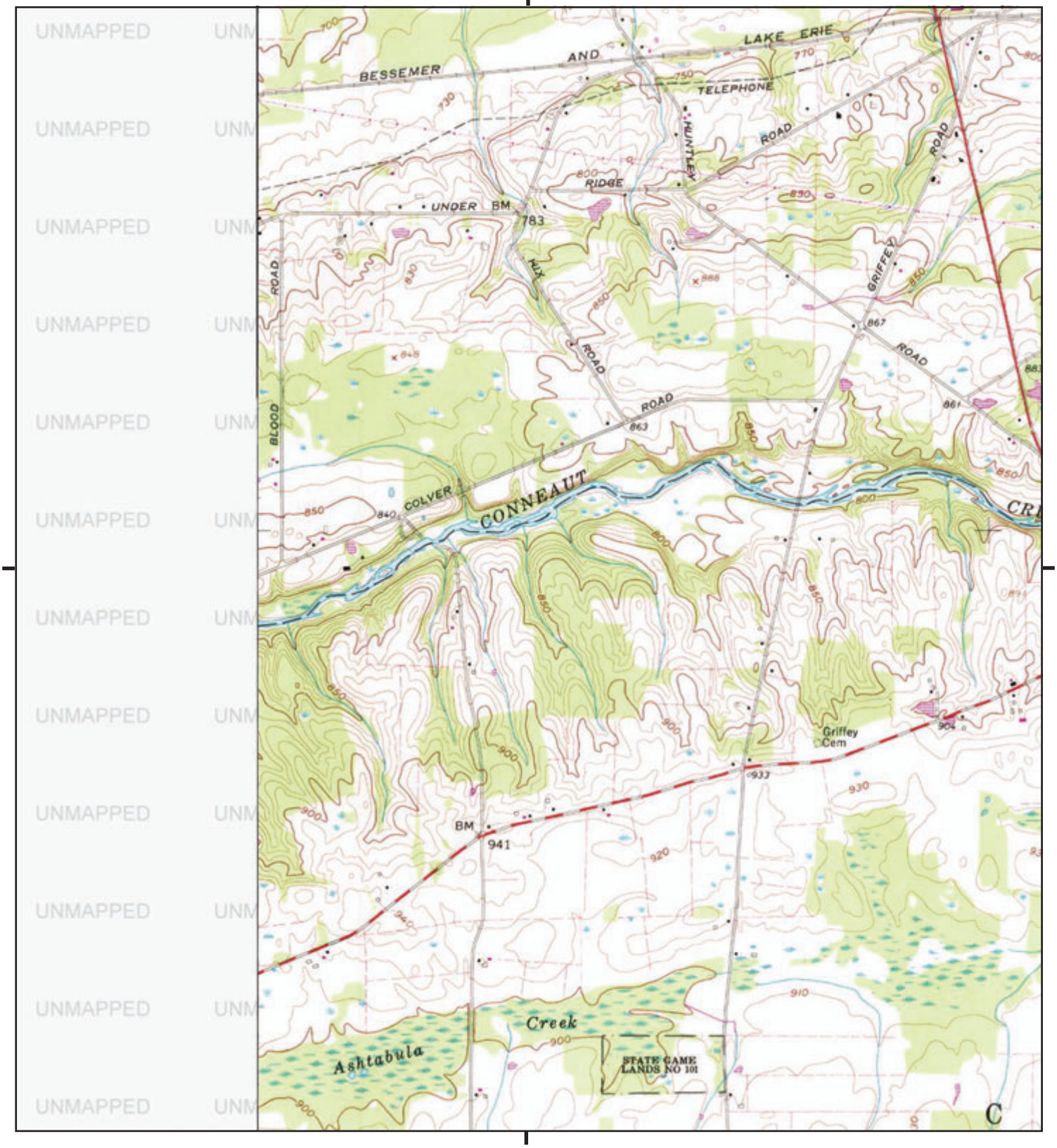
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, East Springfield, 1990, 7.5-minute

SITE NAME: IB Brown Road Study Area and
ADDRESS: 2A Griffey Road Study Area
West Springfield, PA 16443
CLIENT: U.S. Army Corps of Engineers

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, East Springfield, 1977, 7.5-minute

SITE NAME: IB Brown Road Study Area and
ADDRESS: 2A Griffey Road Study Area
West Springfield, PA 16443
CLIENT: U.S. Army Corps of Engineers

N

This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, East Springfield, 1969, 7.5-minute
W, Conneaut, 1970, 7.5-minute

SITE NAME: IB Brown Road Study Area and
ADDRESS: 2A Griffey Road Study Area
West Springfield, PA 16443
CLIENT: U.S. Army Corps of Engineers

N

Historical Topo Map

1959, 1960

This report includes information from the following map sheet(s).

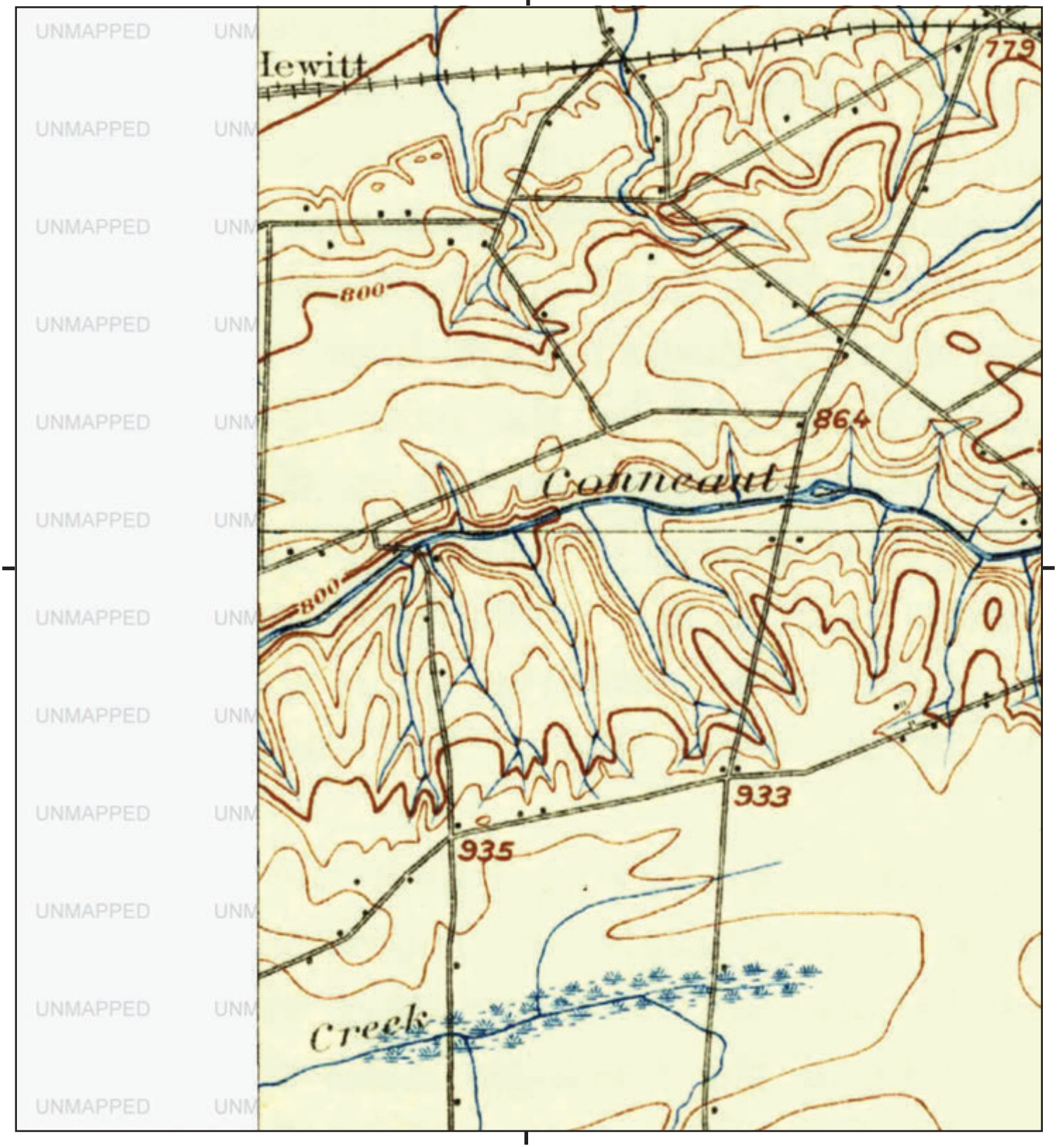
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, East Springfield, 1959, 7.5-minute
W, Conneaut, 1960, 7.5-minute

SITE NAME: IB Brown Road Study Area and
ADDRESS: 2A Griffey Road Study Area
West Springfield, PA 16443
CLIENT: U.S. Army Corps of Engineers

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Girard, 1900, 15-minute

SITE NAME: IB Brown Road Study Area and
ADDRESS: 2A Griffey Road Study Area
West Springfield, PA 16443
CLIENT: U.S. Army Corps of Engineers

N

Appendix E

City Directory Abstract

IB Brown Road Study Area and
2A Griffey Road Study Area
West Springfield, PA 16443

Inquiry Number: 7079489.5
August 11, 2022

The EDR-City Directory Image Report

Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

TABLE OF CONTENTS

SECTION

Executive Summary

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City Directory Images

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Report is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Report includes a search of available city directory data at 5 year intervals.

RECORD SOURCES

EDR's Digital Archive combines historical directory listings from sources such as Cole Information and Dun & Brad street. These standard sources of property information complement and enhance each other to provide a more comprehensive report.

EDR is licensed to reproduce certain City Directory works by the copyright holders of those works. The purchaser of this EDR City Directory Report may include it in report(s) delivered to a customer. Reproduction of City Directories without permission of the publisher or licensed vendor may be a violation of copyright.

Data by infoUSA®

RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. A check mark indicates where information was identified in the source and provided in this report.

Year	Target Street	Cross Street	Source
2017	☑	☑	EDR Digital Archive
2014	☑	☑	EDR Digital Archive
2010	☑	☑	EDR Digital Archive
2005	☑	☑	EDR Digital Archive
2000	☑	☑	EDR Digital Archive
1995	☑	☑	EDR Digital Archive
1992	☑	☑	EDR Digital Archive

FINDINGS

TARGET PROPERTY STREET

2A Griffey Road Study Area
West Springfield, PA 16443

Year	*CD Image*	*Source*
GRIFFEY RD		
2017	pg A2	EDR Digital Archive
2014	pg A5	EDR Digital Archive
2010	pg A8	EDR Digital Archive
2005	pg A11	EDR Digital Archive
2000	pg A14	EDR Digital Archive
1995	pg A17	EDR Digital Archive
1992	pg A19	EDR Digital Archive

FINDINGS

CROSS STREETS

Year	*CD Image*	*Source*	
COLVER RD			
2017	pg. A1	EDR Digital Archive	
2014	pg. A4	EDR Digital Archive	
2010	pg. A7	EDR Digital Archive	
2005	pg. A10	EDR Digital Archive	
2000	pg. A13	EDR Digital Archive	
1995	pg. A16	EDR Digital Archive	
1992	pg. A18	EDR Digital Archive	
N AKERLEY RD			
2017	pg. A3	EDR Digital Archive	
2014	pg. A6	EDR Digital Archive	
2010	pg. A9	EDR Digital Archive	
2005	pg. A12	EDR Digital Archive	
2000	pg. A15	EDR Digital Archive	
1995	-	EDR Digital Archive	Street not listed in Source
1992	-	EDR Digital Archive	Street not listed in Source

City Directory Images

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

COLVER RD 2017

13600	FINN, THEODORE J
13626	WADSWORTH, BERNADETTE S
13752	BATEMAN, DOUGLAS K
13771	ZGREBANK, JEFFREY A
13788	PALO, JACOB D
14055	GABUTTI, STEPHEN M
14107	GOSNELL, DAVID
14241	SKEEL, LARRY C
14273	TURNER, DAVID H
14525	STILLEY, CHRIS J
14571	KUCERA, HELMUT W
14691	MACKEY, KARL W
14815	LAW, JEFF M
14879	ARGENY, THOMAS M
14918	HAMMER, ROLAND R
14991	ENGLISH, HEATHER
	HARPST BROS CONSTRUCTION
14999	KING, JAMES E

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

GRIFFEY RD 2017

7422	BREESE, RONALD G
7447	KERSWILL, JOSEPH
7852	LYLE, KATHLEEN M
8024	SANDEN, WESLEY S
8130	ENGLISH, ANTHONY
8135	DANA, STEVEN C
8169	LENHART, SANDRA L
8235	FREEMAN, THOMAS J
8240	BLOOD, DOLORES M
8255	WHEELER, MICHAEL W
8260	EDWARDS, CHAD L
8370	HULLEY, RONALD E
8520	PATTEN, KEVIN P
8568	BROOKS, JOHN E
8585	REED, ROBERT L
8698	ENGLISH, CARL

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

N AKERLEY RD 2017

8351 HAHN, EDWIN R
8599 KAUFFMAN, EMMA M

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

COLVER RD 2014

13600	FINN, THEODORE J
13626	WADSWORTH, RAY P
13677	KITCEY, KAYLE A
13752	BATEMAN, DOUGLAS K
13771	ZGREBANK, JEFFREY A
13788	PALO, JACOB D
14055	GABUTTI, STEPHEN M
14107	PALAGYI, DAVE J
14185	LANDSBERG, DAN M
14241	MCENROE, JOHN D
14273	TURNER, DAVID H
14525	TAYLOR, ERIC P
14571	KUCERA, HELMUT W
14691	MACKEY, KARL W
14815	LAW, JEFF M
14879	ARGENY, GAIL L
14918	OCCUPANT UNKNOWN,
14999	KING, JAMES E

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

GRIFFEY RD 2014

7263	LIOCANO, BERNARD O
7422	OCCUPANT UNKNOWN,
7447	KERSWILL, JOSEPH
7852	LYLE, KATHLEEN M
7951	LIQUID METER COMPANY INC
8024	SANDEN, WESLEY S
8130	ENGLISH, PHYLLIS J
8135	DANA, STEVEN C
8169	LENHART, RICHARD D
8235	FREEMAN, THOMAS J
8240	BLOOD, DOLORES M
8255	WHEELER, MICHAEL W
8260	EDWARDS, CHAD L
8370	HULLEY, RONALD E
8520	PATTEN, PHILIP M
8568	PATTEN, CHERYL A
8585	REED, ROBERT L
8698	ENGLISH, CARL

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

N AKERLEY RD 2014

8351 BAYLER, JONATHON C
HAHN, GEORGE E
HULIHAN, JAMES
8599 WALKER, CHRISTOPHER S

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

COLVER RD 2010

13600	FINN, THEODORE J
13626	MOSIER, KENNETH J
13752	WALTER, CHRISTINE F
13771	ZGREBANK, JEFFREY A
13788	PALO, DENNIS L
14055	GABUTTI, STEPHEN M
14185	LANDSBERG, DAN M
14241	FOSBURG, CHESTER D
14273	TURNER, DAVID H
14411	YOUNGS, ROBERT R
14525	TAYLOR, ERIC P
14571	KUCERA, HELMUT W
14691	MACKEY, KARL W
14815	LAW, JEFF M
14879	ARGENY, THOMAS M
14918	HAMMER, ROLAND R
14991	HARPST, CHRISTOPHER A
14999	KING, JAMES

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

GRIFFEY RD 2010

6605	THAYER, DENNIS D
6699	BEEBE, BRIAN J
7263	LIOCANO, BERNARD O
7422	BREESE, RONALD G
7447	KERSWILL, JOSEPH
7852	LYLE, KATHLEEN M
7951	LIQUID METER CO INC
8024	SANDEN, WESLEY S
8130	ENGLISH, PHYLLIS J
8135	DANA, STEVEN C
8169	LENHART, ALICE M
8235	FREEMAN, THOMAS J
8240	BLOOD, RICHARD A
8255	DUDENHOEFFER, LISA A
8260	BLOOD, JESS C
8370	HULLEY, RONALD E
8520	PATTEN, PHILIP M
8568	PATTEN, KERRY L
8585	REED, ROBERT L
8698	SPAULDING, SUSAN M

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

N AKERLEY RD 2010

8351 HAHN, GEORGE E

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

COLVER RD 2005

13626	MOSIER, KENNETH J
13684	KING, WILLIAM H
13752	WALTER, CHRISTINE F
13771	ZGREBANK, JEFFREY A
13788	PALO, DENNIS L
14055	GABUTTI, STEPHEN M
14107	POHMAN, JAMES A
14185	LANDSBERG, DAN M
14241	FOSBURG, CHESTER D
14273	TURNER, DAVID H
14525	TAYLOR, ERIC P
14571	KUCERA, HELMUT W
14691	MACKEY, MOLLY
14815	LAW, JEFF M
14879	ARGENY, GAIL L
14918	HAMMER, ROLAND L
14991	FROST, WHITNEY
14999	MORRIS, GARY A

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

GRIFFEY RD 2005

6605	THAYER, VIOLET M
6699	BEEBE, BRIAN J
7263	LIOCANO, BERNARD O
7422	BREESE, RONALD G
7447	KERSWILL, JOSEPH
7951	KONOPA, JOHN W
	LIQUID METER CO INC
8024	SANDEN, WESLEY S
8130	ENGLISH, PHYLLIS J
8135	LENHART, RICHARD D
8169	LENHART, ALICE M
8235	FREEMAN, THOMAS J
8240	BLOOD, RICHARD A
8255	DUDENHOEFER, LISA A
8260	BLOOD, JESS C
8370	HULLEY, RONALD E
8568	PATTEN, KERRY L
8585	REED, ROBERT L
8698	SPAULDING, SUSAN M

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

N AKERLEY RD 2005

8250	FELICIJAN, MYRTLE M
8351	HAHN, GEORGE E
8599	BYRNE, JASON

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

COLVER RD 2000

13600	HENCK, ROBERT H
13626	WARNER, GERALD L
13684	KING, WILLIAM H
13752	VORSE, DAVID J
13788	PALO, DENNIS
14055	MCDONALD, PERCY K
14107	POHMAN, JAMES
14241	FOSBURG, CHESTER D
14273	TURNER, DAVID H
14525	TAYLOR, ERIC
14571	KUCERA, HELMUT W
14691	MACKEY, SULO
14815	LAW, JEFFREY M
14879	JONES, LISA D
14918	HAMMER, ROLAND

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

GRIFFEY RD 2000

6699	WHITNEY, LOIS M
7263	LIOCANO, BERNARD O
7422	BREESE, RONALD G
7447	KERSWILL, MARILYN M
7852	CHARLTON, BRUCE G
8024	SANDEN, WESLEY S
8130	ENGLISH, BRUCE
8135	MIRALDI, STEPHEN
8169	LENHART, C T
8235	FREEMAN, THOMAS
8240	BLOOD, RICHARD A
8260	BLOOD, JESS C
8370	HULLEY, RONALD E
8520	PATTEN, PHILIP
8568	PATTEN, KERRY L
8585	REED, ROBERT L
8698	SPAULDING, RANDY

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

N AKERLEY RD 2000

8250 FELICIJAN, MYRTLE
8351 HAHN, GEORGE E

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

COLVER RD 1995

13600	HENCK, ROBERT H
13626	WARNER, GERALD L
13684	KING, WILLIAM H
13752	VORSE, DAVID J
13788	PALO, DENNIS
14055	HOOVER, DENISE
14241	SEATON, JAY
14525	TAYLOR, ERIC
14571	KUCERA, HELMUT W
14918	HAMMER, ROLAND

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

GRIFFEY RD 1995

6699	WHITNEY, ERNEST G
7422	BREESE, RONALD G
7447	KERSWILL, MARILYN M
7852	CHARLTON, BRUCE G
8024	SANDEN, WESLEY S
8169	LENHART, C T

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

COLVER RD 1992

13600 HENCK, ROBERT H
13788 PALO, DENNIS
14411 MAXON, CHARLES
14525 TAYLOR, ERIC
14571 GILLESPIE, J
KUCERA, HELMUT W
14815 LAWRENCE, JANET K

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

GRIFFEY RD 1992

7852 CHARLTON, BRUCE G
8024 SANDEN, WESLEY S
8169 LENHART, C T

Appendix F

Study Area Photos

Study Area Photos

PA Fish and Boat Commission Property (Conn28)

Photo 1: Grassy area looking toward Griffey Rd bridge

Photo 2: A few tires near Griffey Rd bridge

Photo 3: Tire near Griffey Rd bridge

Photo 4: Tire next to Griffey Rd bridge

Photo 5: Looking upstream under Griffey Rd bridge

Photo 6: Looking upstream under Griffey Rd bridge

Photo 7: Looking downstream next to Griffey Rd bridge

Photo 8: Looking downstream next to Griffey Rd bridge

Photo 9: Overlooking property from Griffey Rd bridge

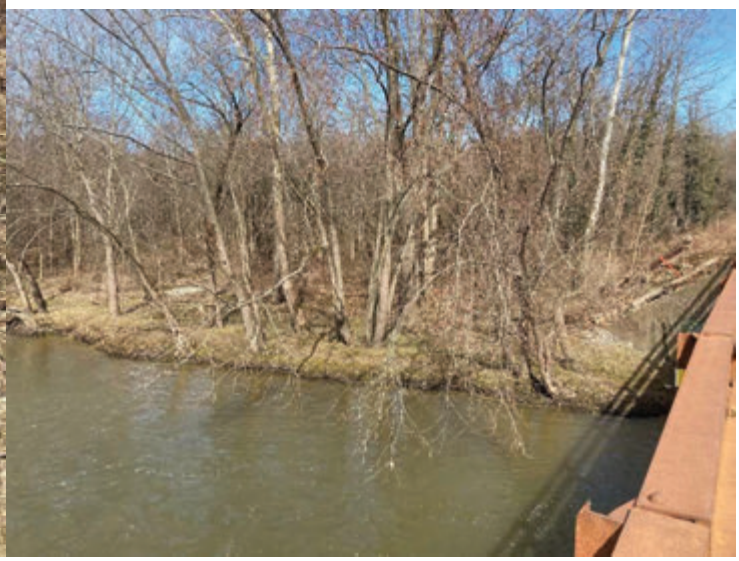

Photo 10: Overlooking property from Griffey Rd bridge

Photo 11: Parking lot

Photo 12: Parking lot

Edwards Property (Conn26)

Photo 13: Overlooking property from Griffey Rd bridge

Photo 14: Effluent from culvert near Griffey Rd bridge

Photo 15: Effluent from culvert near Griffey Rd bridge

Photo 16: Grassy area looking downstream along shoreline

Wheeler Property (Conn30)

Photo 17: Sparse trash

Photo 18: Sparse trash

Photo 19: Pool of standing water

Photo 20: Looking east over large low-lying area

Photo 21: Looking downstream along the shoreline

Photo 22: Looking upstream along the shoreline

Taylor Property (Conn32)

No images

Mikhalak Property (Conn33)

Photo 23: Looking west through open wooded area

Photo 24: Looking east through open wooded area

Photo 25: Looking up a tributary that leads into Conneaut Creek

Photo 26: Miscellaneous trash (basketball for example)

Lee Property (Conn36)

Photo 27: Looking downstream along shoreline

Photo 28: Looking upstream along cliff-lined shoreline

Photo 29: Miscellaneous trash near the cliff-lined shoreline

Photo 30: Miscellaneous trash near the cliff-lined shoreline

Photo 31: Miscellaneous trash, mainly metal roofing, near the cliff-lined shoreline

Carson Property (Conn38)

Photo 32: Tributary leading into Conneaut Creek

Pollick Property (Conn40)

Photo 33: Overlooking a tributary leading to Conneaut Creek

Photo 34: Old water spigot and miscellaneous trash

Photo 35: Steel well casing

Photo 36: Well cover

Photo 37: Small abandoned house near cliff-lined shoreline

Photo 38: Another angle of the old, abandoned house

Photo 39: Remains of wooden porch amongst miscellaneous trash

Photo 40: Inside of house containing deteriorating household items

Photo 41: Old farming equipment

Photo 42: Old farming equipment

Brugger Property (Conn41)

Photo 43: Overview of property (on left) looking upstream from Route 6N bridge

Murphy Property (Conn39)

Photo 44: Looking downstream from Route 6N bridge

Photo 45: Looking west through open wooded area

Shelter Property (Conn37)

Photo 46: Looking west over a channel that branches off the creek

Photo 47: Looking east over a channel that branches off the creek

Yochim Property (Conn35)

Photo 48: Raised wooden shelter, likely used for hunting

Kelly Property (Conn34)

Photo 49: Location of old sugar shack viewed from afar

Photo 50: Closer view of old sugar shack

Photo 51: View of old sugar shack, looking west

Photo 52: Miscellaneous trash near old sugar shack

Photo 53: View of old sugar shack, looking east

Photo 54: Miscellaneous trash around old sugar shack

Photo 55: Tubes running between trees for collection of sap

Photo 56: Old work bench and barrel for maple syrup production

Photo 57: Miscellaneous trash including a pan and metal bucket

Photo 58: Empty metal barrel from maple syrup company

Photo 59: Empty barrel and other miscellaneous trash

Photo 60: Wooden ramp near old sugar shack

Photo 61: Empty plastic buckets

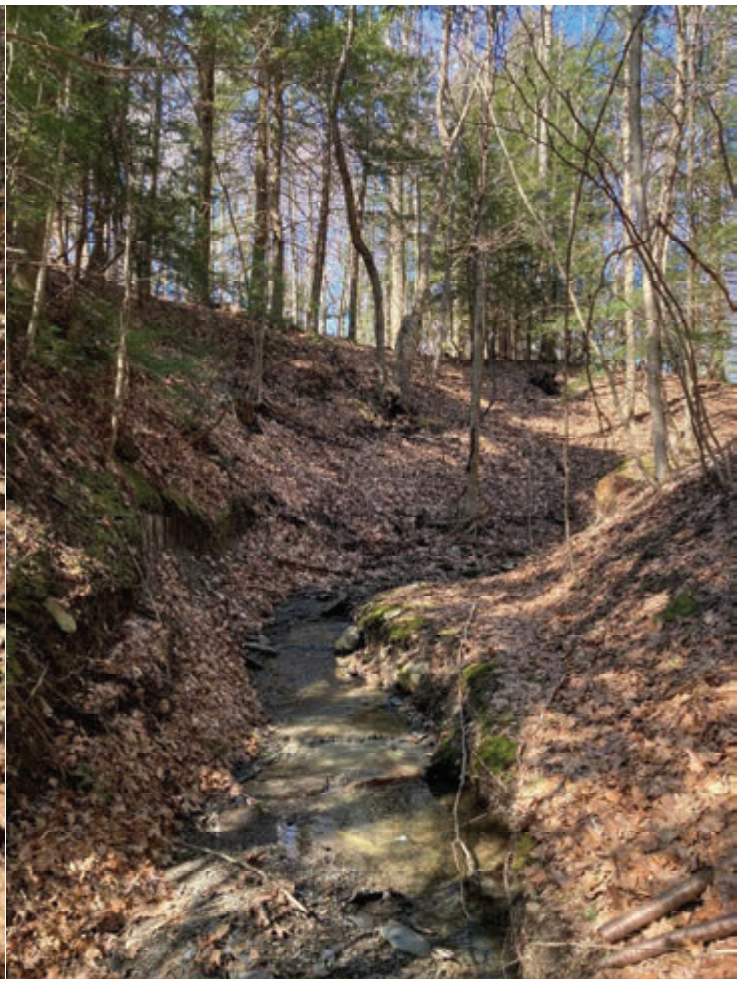

Photo 62: Looking upstream up a tributary

Photo 63: Miscellaneous trash on slope next to tributary

Photo 64: Miscellaneous trash on slope next to tributary

Photo 65: Rusted out washing machine

Photo 66: Rusted out appliance

Photo 67: Miscellaneous bottles and jars on top of slope

Photo 68: Tires, bottles, and jars on top of slope

Konopa Property (Conn31)

Photo 69: Looking upstream from property

Photo 70: Looking downstream from property

Photo 71: Looking west through open wooded area

Photo 72: Looking up a channel that leads to the creek

Lenhart Property (Conn29)

Photo 73: Looking down a channel that leads to the creek

Photo 74: A pile of miscellaneous tires

Photo 75: Pile of tires near Griffey Rd

Appendix G

Owner/Occupant Interview

Environmental Site Assessment Questionnaire

The questionnaire information was provided by:

Name: Michael Wheeler Title: Property Owner

Signature: _____

Date: 08-Mar-2023

ENVIRONMENTAL INFORMATION

PREVIOUS REPORTS, DOCUMENTS AND OWNERS

1. Are you aware if a previous Environmental Assessment has ever been performed on the subject property? If yes, are you aware of the recommendations made in the report or please provide a copy of the report?

☐ Yes ☒ No ☐ Do not Know

2. Do you have any other environmentally associated documents, such as compliance audits, environmental permits (such as an NPDES permit, boiler permit, wastewater permit), registrations (such as for a underground storage tank) or material safety data sheets? If yes, please provide a copy of the document(s)

☐ Yes ☒ No ☐ Do not Know

3. Can you provide contact information (name and phone number) of the previous owner of the property? If yes, please provide below.

☐ Yes ☒ No ☐ Do not Know

HISTORICAL & PRESENT USAGE/SITE CONDITIONS – SUBJECT AND ADJOINING PROPERTIES

1. Are you aware of the prior use of the subject property, i.e., any previous development, undeveloped? If so, please describe. It was likely just farmland. Bought the property as a residential property.

2. Has fill dirt ever been brought onto the subject property that originated from a contaminated site or from an unknown source?

Just gravel for driveway

☐ Yes ☒ No ☐ Do not Know

3. Are there currently or have there ever been any pits, ponds or lagoons on the subject property utilized in connection with waste treatment or waste disposal?

Not too familiar with gas wells, but when gas well was being dug, there was a pit dug for some sort of waste, which was probably water

☒ Yes ☐ No ☐ Do not Know

4. Are you currently aware of or have there ever been any hazardous substances, petroleum products, tires, car or industrial batteries, pesticides or other chemicals or waste materials that have been dumped, buried or burned on the subject property?

☐ Yes ☒ No ☐ Do not Know

5. Have any of the adjoining properties ever been used for industrial purposes? (including but not limited to a gas station, dry cleaner, auto repair facility, landfill, waste treatment, printing facility etc)? If yes, please describe.

☐ Yes ☒ No ☐ Do not Know

6. Are any of the adjoining properties currently being used for industrial purposes? If yes, please describe.

☐ Yes ☒ No ☐ Do not Know

7. Do you have any specialized knowledge or experience related to the property or nearby properties? For example, are you involved in the same line of business as the current or former occupants of the property or an adjoining property so that you would have specialized knowledge of the chemicals and processes used by this type of business?

☐ Yes ☒ No ☐ Not Applicable

8. If the subject property is served by a private well or non-public water system, is there evidence or do you have prior knowledge that contaminants have been identified in the well or system that exceed guidelines applicable to the water system or that the well has been designated as contaminated by any government environmental/health agency? If an on-site well is present, please attach a copy of the most recent water quality testing report.

Property is served by a private well. No knowledge of contamination

☐ Yes ☒ No ☐ Not Applicable

AAI and REGULATORY QUESTIONS

In order to qualify for one of the Landowner Liability Protections offered by the Small Business Liability Relief and Brownfields Revitalization Act of 2001, you must provide the following information (if available). Failure to provide this information could result in a determination that "all appropriate inquiry" is not complete.

1. Are you aware of any past or current existence of hazardous substances, specific chemicals, or petroleum products on the subject property or any facility located on the property?

☐ Yes ☒ No ☐ Do not Know

2. Are you aware of any past or current spills or other chemical releases that have taken place at the property?

☐ Yes ☒ No ☐ Do not Know

3. Do you know of any clean ups (with respect to hazardous substances, specific chemicals, or petroleum products) that have occurred at the property?

☐ Yes ☒ No ☐ Do not Know

4. Are you aware, based on your knowledge of the property, if there are any obvious indicators that point to the presence or likely presence of contamination at the property?

☐ Yes ☒ No ☐ Do not Know

5. Do you have any knowledge of filed or recorded environmental cleanup liens under federals, state or local law or governmental notification relating to past or recurrent violations of environmental laws with respect to the subject property or any facility located on the property?

☐ Yes ☒ No ☐ Do not Know

6. Are there any potential or pending lawsuits or administrative actions concerning a release or threatened release of hazardous substances or petroleum product involving the subject property or any facility located on the property?

☐ Yes ☒ No ☐ Do not Know

7. Are you aware of any areas of activity or use limitations (AULs) such as engineering controls, land use restrictions or institutional controls that are in place at the property and/or have been recorded or filed in a registry under federal, state or tribal law?

☐ Yes ☒ No ☐ Do not Know

8. (Answer this question only if this is an acquisition) Does the purchase price being paid for this property reasonably reflect the fair market value of the property? If there is a difference, have you considered or determined whether the lower price is because contamination is known or believed to be present at the property?

☐ Yes ☐ No ☐ Do not Know

STORAGE TANKS AND DRAINS

1. Are there currently or are you aware if there have ever previously been any registered or unregistered storage tanks, aboveground or underground, located on the subject property? If so, please attach copies of documentation such as tank closure/removal reports, tank tightness tests or registration/regulatory information.

There is an aboveground tank that stores fuel oil

☒ Yes ☐ No ☐ Do not Know

2. Are there currently or are you aware if there have ever previously been any vent pipes, fill pipes, or access ways indicating a fill pipe protruding from the ground on the property or adjacent to any structure located on the subject property?

☐ Yes ☒ No ☐ Do not Know

3. Are there currently or are you aware if there have ever previously been any current evidence of leaks, spills, or staining by substances other than water, or foul odors, associated with any flooring, drains, walls, ceilings, or exposed grounds on the subject property?

☐ Yes ☒ No ☐ Do not Know

TRANSFORMERS AND HYDRAULIC EQUIPMENT

1. Are there are any transformers, capacitors, and/or hydraulic equipment on the subject property?

Transformer on the power line

☒ Yes ☐ No ☐ Do not Know

2. If yes, are there any records indicating the presence or absence of PCBs in this equipment. If so, please attach copies of this documentation.

☐ Yes ☒ No ☐ Do not Know

3. Are the transformers owned by the subject property or by the local utility? If owned by the utility, please note the name of the utility.

Yes, Northwest Rural Electric Cooperative Association

Appendix H

Records Review and Preliminary Assessment of Potential Properties – March 2022

GLFER Conneaut Creek Sea Lamprey Barrier

Records Review and Preliminary Assessment of Potential Properties

21 March 2022

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1. Introduction

1.1 Objective

The objective of this preliminary assessment is to identify recognized environmental conditions (RECs) that would warrant further consideration within and in the immediate vicinity of the properties being contemplated for the development of alternatives to prevent or significantly reduce the numbers of sea lamprey from reaching 369 river miles of spawning habitat in Conneaut Creek.

1.2 Scope of Work

This is a screening level assessment performed mainly through a standard search of federal and state environmental record and available aerial photographic imagery.

2. Site Description

2.1 Area Identification

The study area is in northwestern Pennsylvania and consists of properties adjacent to Conneaut Creek from the Ohio/Pennsylvania border and approximately six miles

eastward. A total of 83 properties (CONN 1 through 83) are being contemplated for the project. The study area and individual properties are depicted within Figures 1 through 4.

2.2 Vicinity Characteristics

In general, the area is rural with minimal development. Most of the study area consists of open fields, forests, and wetland areas, which are more prevalent further upstream in the study area. In addition, further upstream the creek demonstrates more sinuosity. There is a railroad line just outside the study area north of the creek at CONN 77 and 79. Upstream of the study area there is the town of Albion, Pennsylvania.

3. Records Review

Records reviewed for this preliminary assessment were obtained from the Pennsylvania Department of Environmental Protection (PADEP) eMapPA and the US Environmental Protection Agency (USEPA) Enviromapper/Envirofacts geospatial web viewers. Records were searched for listings within and adjacent to the subject properties (CONN 1 through 83). Aerial imagery was viewed utilizing Google Earth.

3.1 Aerial Photos

The aerial images available for review include the years 1985, 1993, 2004, 2005, 2006, 2008, 2009, 2010, 2011, 2012, 2014, 2015, and 2019. The only significant change observed over time was a decrease in the tree cover within the first 2 miles, from the Pennsylvania/Ohio border.

3.2 Database Records

The applicable state (eMapPA) and federal (Envirofacts) environmental databases that were reviewed within the Conneaut Creek search area are described in Attachments A and B, respectively.

4. Findings

The following federal and state environmental databases produced records within the Conneaut Creek search radius:

PADEP - Oil and Gas Locations - Oil and Gas Wells

Conventional oil and gas wells are scattered throughout the entire study area and shown on Figure 5. No records were found indicating any of the sites had past releases or required response actions; however, the construction of a lamprey barrier could cause permanent or seasonal inundation, which could negatively affect the operation wells if a well was inundated. Four wells located within 200 feet from the bank of Conneaut Creek and are less than 850 feet in elevation above sea level. These wells would have the highest likelihood of being inundated and are located within CONN 50, 52, 63, and 74.

PADEP – Storage Tanks – Storage Tanks Inactive

The following inactive storage tank is located within a property adjacent to Conn 11; however, no records indicating a release were found and the inactive tank is approximately a mile south of the creek.

Facility ID: 25-90700
Facility Name: ALBION FORGE
Facility Address1:14800 W CHERRY HILL RD
Facility City: ALBION
Facility State: PA
Facility Zip: 16401-7828
Facility County: Erie
Facility Municipality: Albion Boro
Tank Owner ID:167062
Tank Owner Name: CORNWELL QUALITY TOOLS CO
Tank Owner Address1: 200 N CLEVELAND AVE
Tank Owner City: MOGADORE
Tank Owner State: OH
Tank Owner Zip: 44260-1205
Primary Facility ID: 592741
Site ID: 574383

Land Recycling Cleanup Location – Soil Media

The following land recycling clean up location (brownfield) is located north of Conn 57 and approximately 0.5 miles north of Conneaut Creek. This is an active soil remediation ongoing at the site which appears to be contained to the subject property and no records indicating other site media are impacted.

Primary Facility Name: HARTHAN SITE
Facility Address1: MCKEE RD
Facility City: SPRINGFIELD
Facility State: PA
Facility County: Erie
Site ID: 600459
Primary Facility ID: 625683
Sub Facility Name: HARTHAN SITE-SOIL
Sub Facility ID: 748026
Primary Facility Type: LAND RECYCLING CLEANUP LOCATION
Other Facility ID: 6-25-932-197
Sub Facility Type: SOIL MEDIA
S Other ID: 748026
Site Status: ACTIVE
Primary Facility Status: ACTIVE
Compliance: YES

5. Conclusion

The only RECs along the subject reach of Conneaut Creek that would warrant further evaluation with respect to construction of the sea lamprey barrier are the oil and gas wells located within CONN 50, 52, 63, and 74. It is unlikely that any of these wells are located within the existing 100-year floodplain or would be permanently/seasonally inundated at base flows with the size structure USACE is currently being contemplated; however, this needs to be verified to ensure that the proposed alternatives, would not impact those locations.

Once the feasibility study progresses and specific properties are selected, it is recommended that USACE prepares a full Phase I Environmental Site Assessment, in accordance with ASTM E1527-21, for those properties.

FIGURES

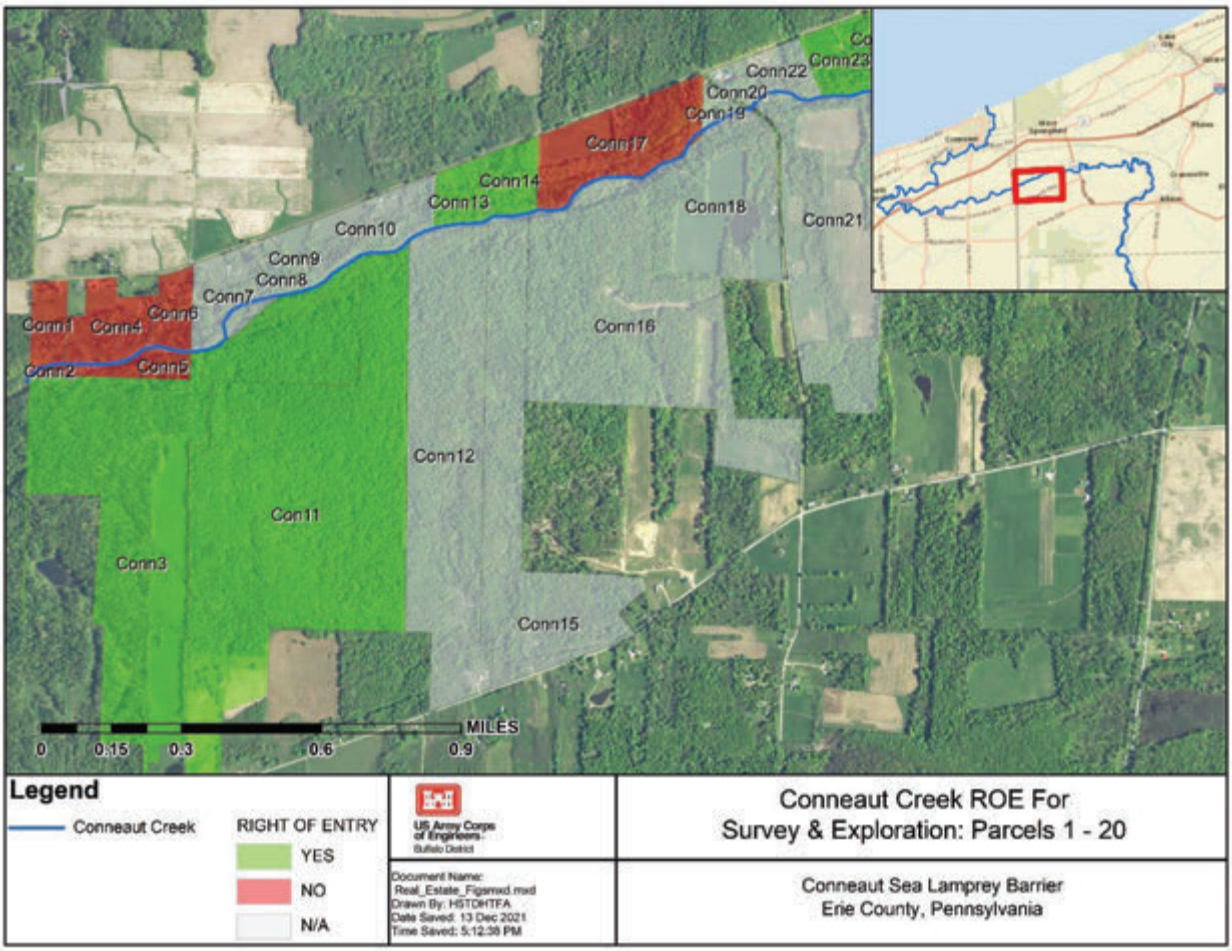

Figure 1 – Study Area - CONN 1-20

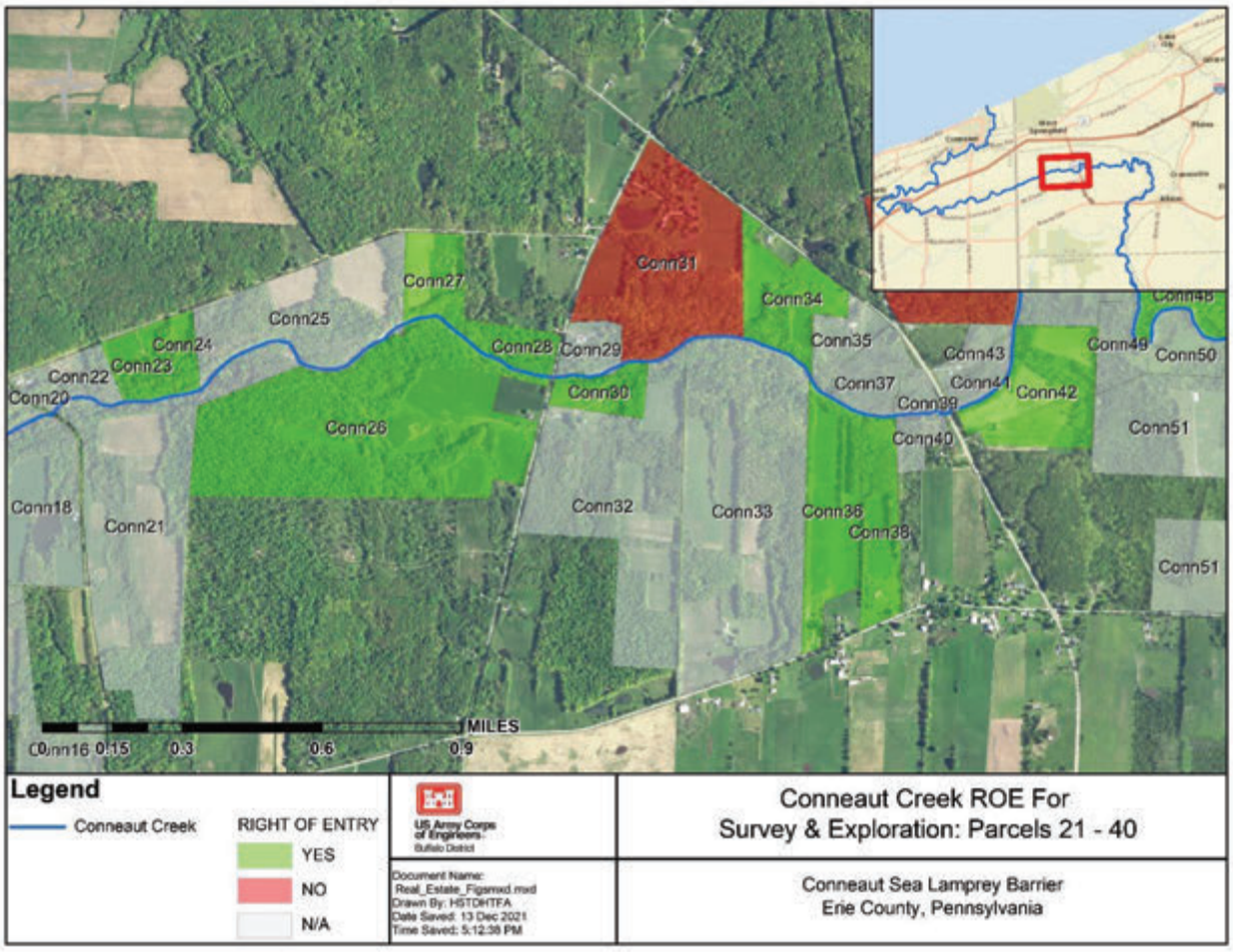

Figure 2 – Study Area - CONN 21-40

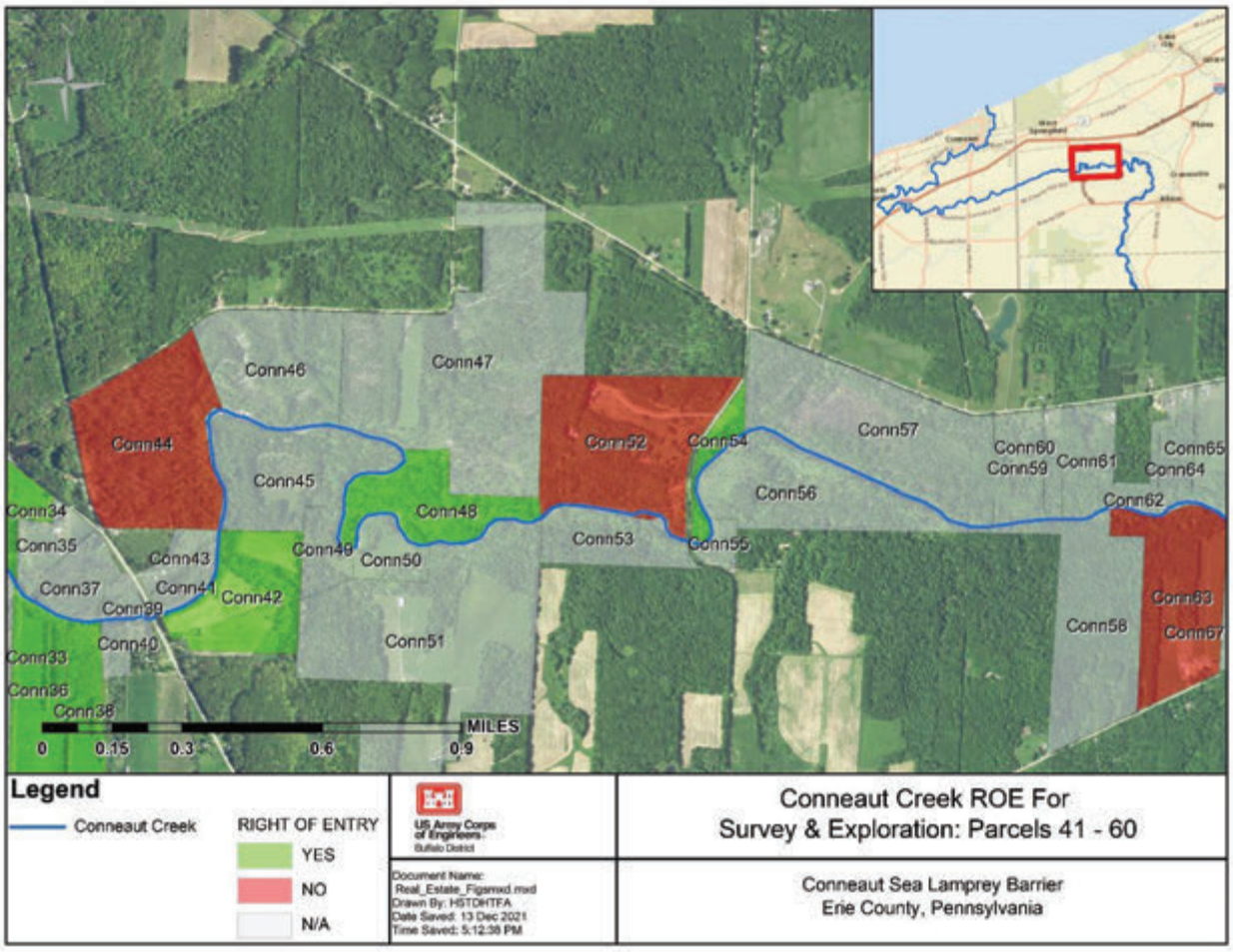

Figure 3 – Study Area - CONN 41-60

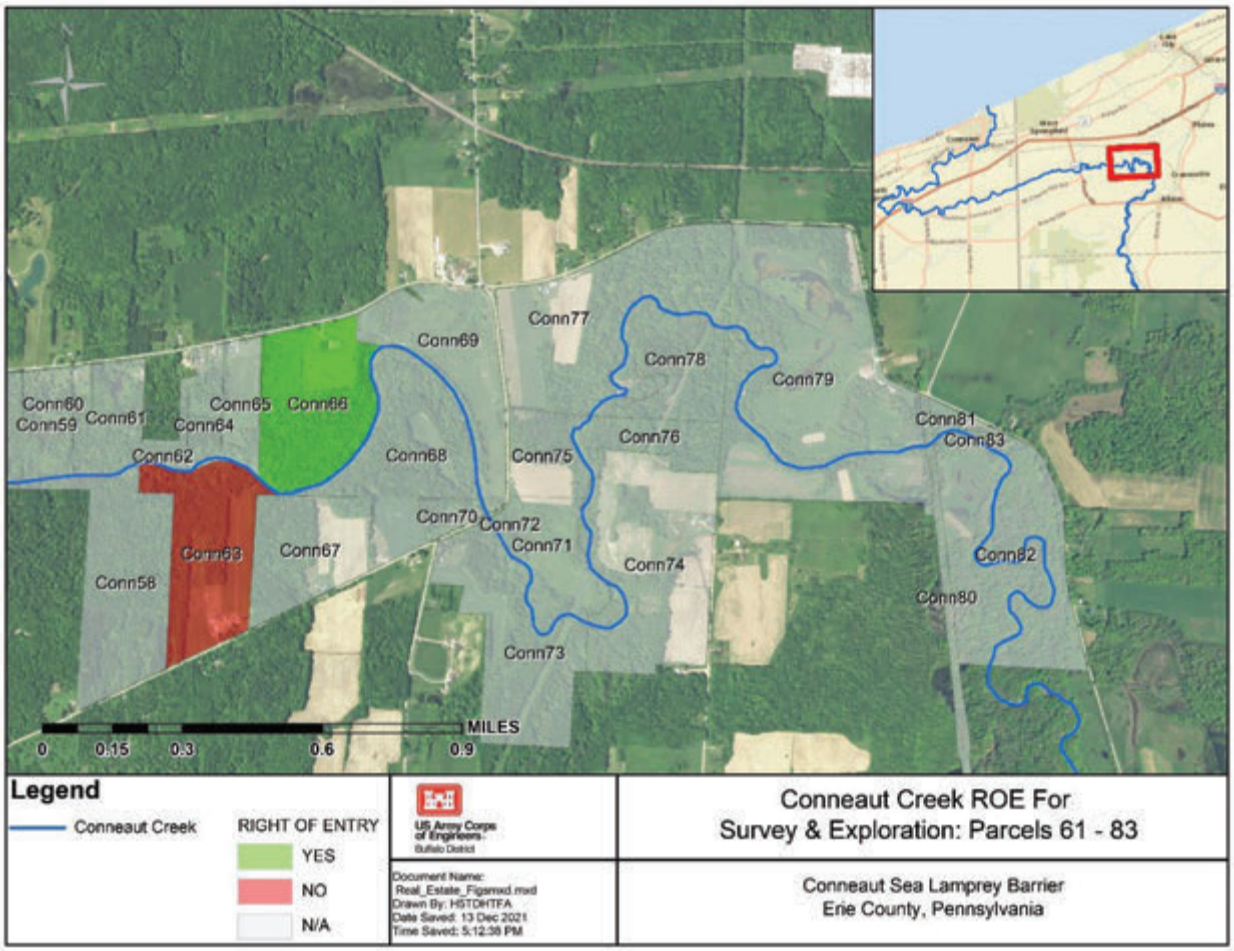

Figure 4 – Study Area – CONN 61-83

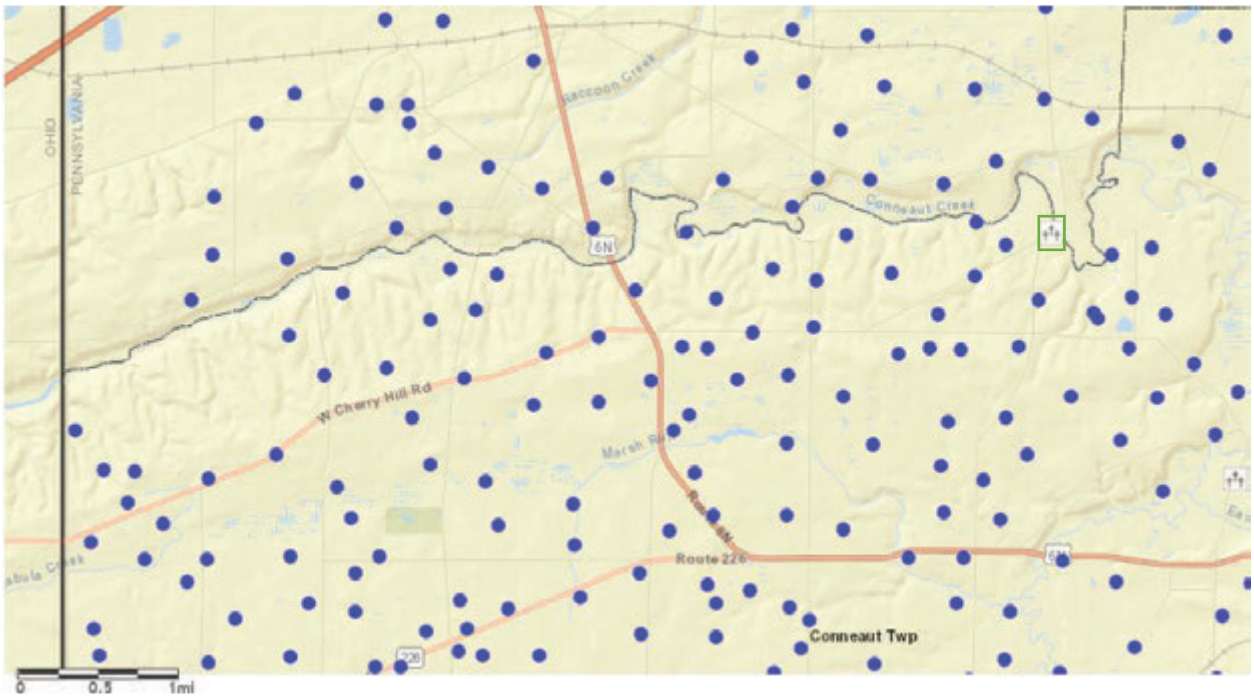

Figure 5 – Study Area - Oil and Gas Well Locations

ATTACHMENTS

Attachment A- Applicable PADEP eMapPA Datasets

https://gis.dep.pa.gov/emappa/Links/eMapPAInfo.htm

Abandoned/Orphaned Wells - Regulated Facilities/Oil and Gas	This layer depicts the locations of abandoned and orphaned wells known by the Pennsylvania Department of Environmental Protection. This information is acquired when orphaned and abandoned wells are discovered by Pennsylvania municipalities, landowners and other agencies and then reported to the Pennsylvania Department of Environmental Protection. When abandoned and orphaned wells are investigated, a scoring is assessed to the well. High priority wells with no responsible party are addressed by the Well Plugging Program. Those wells are analyzed, and occasionally lower priority wells are included if located in close proximity to the high priority wells on well plugging contracts.
AML Inventory Site - Regulated Facilities/Mining	The AML (Abandoned Mine Land) Inventory is a collection of areas where surface features of abandoned mines are present. Presently the data is shown using three layers. AML Inventory Sites is used to show the entire boundary of a problem area. AML Points and AML Polygons are used to show specific problems within a designated inventory site. The inventory does not include complete and comprehensive coverage of abandoned underground mines, surface or underground mines that were permitted and closed after 1982, or active surface or underground mines. For further information concerning mining in your area, please contact the local PADEP office.
Captive Hazardous Waste - Regulated Facilities/Waste	A Captive Hazardous Waste Operation is a PADEP primary facility type related to the Waste Management Hazardous Waste Program. The sub-facility types related to Captive Hazardous Waste Operations that are included in eMapPA are: Boiler/Industrial Furnace, Disposal Facility, Hazardous Generator, Incinerator, Recycling Facility, Storage Facility, and Treatment Facility.

Coal Mining Operation - Regulated Facilities/Mining	A Coal Mining Operation is a PADEP primary facility type related to the Mining Program. The sub-facility types related to Coal Mining Operations that are included in eMapPA are: Coal-Aboveground Storage Tank - aboveground tanks greater than 250 gallons used to store a regulated substance, motor oil or fuel on a coalmine permit. These tanks are regulated under the coal mining regulations since they are specifically exempted from the storage tank regulations. Discharge Point - Discharge of water from an area as a result of coal mining activities. Mineral Preparation Plant - Facility at which coal is cleaned and processed. Mining Stormwater GP - General permit for stormwater discharges associated with coal mining activities in which the main pollutant is sediment. Discharge is not into a High Quality or Exceptional Value designated stream. NPDES Discharge Point - An effluent discharge at a coal mine operation permitted under the National Pollutant Discharge Elimination System. Post Mining Treatment - Post-mining discharges are groundwater seeps and flows that occur after a mine has been completed and reclaimed. Many of these discharges have become contaminated by contacting acid producing rock in the mine environment. Untreated discharges that enter clean streams cause acidification, which immediately kills much of the aquatic life. Coal mines that are predicted to have discharges are not permitted; however, coal mining operators are required to treat post-mining discharges in cases where the predictions do not come true. Through advances in predictive science, less than 2 percent of the permits issued today result in a post-mining discharge. New technologies, including alkaline addition and special handling of acid producing material, are being studied to help address the remaining 2 percent. Refuse Disposal Facility - An area used for disposal or storage of waste coal, rock, shale, slate, clay, and other coal mining related materials. Refuse Reprocessing - Facility at which coal is extracted from waste coal, rock, shale, slate, clay, and other coal mining related material, i.e., coal refuse. Surface Mine - Surface mining of coal by removing material which lies above the coal seam. Includes, but is not limited to, strip, auger, quarry, dredging and leaching mines. Underground Mine - Deep mining of coal. Includes, but is not limited to, portal, tunnel, slope and drift mines.
Commercial Hazardous Waste Operation - Regulated Facilities/Waste	A Commercial Hazardous Waste Operation is a PADEP primary facility type related to the Waste Management Hazardous Waste Program. The sub-facility types related to Commercial Hazardous Waste Operations that are included in eMapPA are: Disposal Facility, Hazardous Generator, Recycling Facility, Storage Facility, and Treatment Facility.

Conservation Wells - Regulated Facilities/Oil and Gas	The conservation well layer identifies the permitted surface location of oil and gas conservation wells that have not been plugged. These include active, regulatory inactive, orphaned, and abandoned wells. A conservation well is any well which penetrates the Onondaga horizon, or in those areas in which the Onondaga horizon is nearer to the surface than thirty-eight hundred feet, any well which exceeds a depth of thirty-eight hundred feet beneath the surface.
Conventional Wells - Regulated Facilities/Oil and Gas	A conventional well is a bore hole drilled or being drilled for the purpose of or to be used for the production of oil or natural gas from only conventional formation(s). A conventional formation is any formation that does not meet the statutory definition of an unconventional formation.
Digitized Mined Area - Regulated Facilities/Mining	Coal mining has occurred in Pennsylvania for over a century. The maps to these coal mines are stored at many various public and private locations (if they still exist at all) throughout the Commonwealth. This dataset tries to identify the mined out areas of the various coal seams in Pennsylvania. This information can be used for many environmental related issues, including mine land reclamation and determination of needs for Mine Subsidence Insurance. The information in this dataset was gathered from mine maps at these various locations so that the data can be readily available to environmental professionals.
Envirofacts Facilities - Federal EPA Sites	This layer displays the location and information about Pennsylvania facilities that are included in the federal Facility Registry System (FRS). FRS is a centrally managed database that identifies facilities, sites, or places subject to environmental regulations or of environmental interest.
Farm Line Maps Well Locations - Regulated Facilities/Oil and Gas	In the 150 years since the first oil well was drilled, an unknown number of oil and gas wells have been drilled in Pennsylvania. An estimate by Independent Petroleum Association of America places that number at approximately 325,000. PADEP is aware of 2,900 Plugged wells, 8,000 Orphaned and Abandoned Wells and 111,000 permitted wells, which leaves over 200,000 wells unaccounted for. Many oil and gas wells are within close proximity to coal mining operations. PADEP's Bureau of Mine Safety and Bureau of Oil and Gas PPM are in a joint endeavor to locate abandoned and orphaned wells in active mining areas. This will allow for proper plugging or avoidance prior to mining operations and prevent gas migration. This process included written correspondence to operators requesting Farm Line Maps, which were then referenced in GIS to real world locations by using the following control points: roads, houses, water bodies and known coordinates. By using GIS, relative

	locations were determined and placed side by side with current ariel photography to determine plausible locations of unknown wells. The following attribute fields apply to the nearest plugged well, abandoned or orphaned well, spudded well and permitted well site to the Farm Line well:Plug_Dist_ft, Plug_Permit, A_O_Dist_ft, A_O_APInum, Spud_dist_ft, Spud_API, Permit_Dist_ft, Permit_API
Groundwater Monitoring Network - Regulated Facilities/Streams & Water/Water Monitoring	Monitoring of groundwater quality in Pennsylvania is usually done near a permitted facility to determine the impacts of the facility on the groundwater, or to monitor as a safeguard for a public water supply well. The Groundwater Monitoring Network layer represents the point locations and data for 1,089 groundwater quality monitoring points sampled under the Fixed Station Network (FSN) and Ambient Survey Groundwater Monitoring Program.
Historical Oil and Gas Well Locations - Regulated Facilities/Oil and Gas	These well locations were derived from historical mine maps known as the WPA, KSheet, and HSheet collections. These locations are provided for informational purposes only and should not be sole means of decision making and are in no way a substitute for actual on the ground observation.
Industrial Mineral Mining Operation - Regulated Facilities/Mining	An Industrial Mineral Mining Operation is a PADEP primary facility type related to the Industrial Mineral Mining Program. The sub-facility types included in eMapPA are: Deep Mine - Underground mining of industrial minerals, i.e., noncoal mining. Includes, but is not limited to, industrial minerals extracted from beneath the surface by means of shafts, tunnels, adits or other mining openings. Discharge Point - Discharge of water from an area as a result of industrial mining activities, i.e. noncoal mining. Mineral Preparation Plant - Facility at which industrial minerals (i.e. noncoal minerals) are cleaned and processed. Mining Stormwater GP - General permit for stormwater discharges associated with industrial mineral mining activities in which the main pollutant is sediment. Discharge is not into a High Quality or Exceptional Value designated stream. NPDES Discharge Point - National Pollutant Discharge Elimination System effluent discharge point for Industrial Mineral (Noncoal) Mine Sites. Post Mining Treatment - Inactive Industrial Mine with a permitted treatment facility. Surface Mine - Surface mining of industrial minerals (i.e. noncoal minerals) by removing material which lies about the industrial minerals. Includes, but is not limited to, strip, augur, quarry, dredging and leaching mines.
Mine Drainage Treatment- Regulated Facilities/Water	Mine Drainage Treatment/Land Reclamation Locations are clean-up projects that are working to eliminate some form of abandoned mine.

Mine Drainage Treatment/Land Recycling Project - Regulated Facilities/Land Reuse	Mine Drainage Treatment/Land Reclamation Locations are clean-up projects that are working to eliminate some form of abandoned mine.
Mine Drainage Treatment/Land Recycling Project - Regulated Facilities/Mining	Mine Drainage Treatment/Land Reclamation Locations are clean-up projects that are working to eliminate some form of abandoned mine.
Monitoring Points - Regulated Facilities/Sample Information System	The Monitoring Points layer is part of the Department's Sample Information System (SIS) that represents discreet locations where numerous samples have been or will be collected. SIS serves as a repository for the results of chemical analyses of samples analyzed by the PADEP Bureau of Laboratories. It also serves as the repository for some self-monitoring samples submitted to the Department.
Municipal Waste Operation - Regulated Facilities/Waste	A Municipal Waste Operation is a PADEP primary facility type related to the Waste Management Municipal Waste Program. The sub-facility types related to Municipal Waste Operations that are included in eMapPA are: Composting, Land Application, Abandoned Landfills, Active Landfills, Processing Facility, Resource Recovery, and Transfer Stations.
Oil and Gas Encroachment Locations - Regulated Facilities/Oil and Gas	An Encroachment Location for Oil & Gas is a PADEP primary facility type related to the Oil and Gas Program. The sub-facilities that fall under Oil and Gas Encroachment also exist under Encroachment Locations. The difference is in the PADEP program that regulates the facilities.
Oil and Gas Encroachment Locations - Regulated Facilities/Water	An Encroachment Location for Oil & Gas is a PADEP primary facility type related to the Oil and Gas Program. The sub-facilities that fall under Oil and Gas Encroachment also exist under Encroachment Locations. The difference is in the PADEP program that regulates the facilities.
Oil and Gas Locations - Regulated Facilities/Oil and Gas	An Oil and Gas Location is a PADEP primary facility type related to the Oil and Gas Program. The sub-facility types related to oil and gas that are included in eMapPA are: Land Application - An area where drilling cuttings or waste are disposed by land application. Pit - An approved pit that is used for storage of oil and gas well fluids. Well - A well associated with oil and/or gas production.
Oil and Gas Water Pollution Control	An Oil and Gas Location is a PADEP primary facility type related to the Oil and Gas Program. The sub-facility types related to Oil and Gas that are included in eMapPA are: Land Application - An area where drilling

Facilities - Regulated Facilities/Oil and Gas	cuttings or waste are disposed by land application. Pit - An approved pit that is used for storage of oil and gas well fluids. Well - A well associated with oil and/or gas production.
Oil and Gas Water Pollution Control Facility- Regulated Facilities/Water	An Oil and Gas Water Pollution Control Facility is a PADEP primary facility type related to the Oil & Gas Program. The following are the sub-facility types related to Water Pollution Control that are included in eMapPA: Discharge point - The outfall from a wastewater treatment facility for oil and gas fluids. Internal Monitoring Point - A monitoring point within the wastewater treatment system where samples are collected. Treatment Plant - A facility for treating oil and gas wastewater to achieve permit effluent limits.
Orphan Mine Discharge - Regulated Facilities/Mining	The Orphan Mine Discharges layer refers to those mine water discharges for which there are no responsible entities to provide treatment of the discharges, and those discharges that do not have a funding mechanism (e.g. trust fund) in place to cover perpetual treatment. Emphasis and priority for remediation is placed on discharges that have the potential for recycling and reuse (i.e. high volume) and those that have the potential for third party treatment or abatement using waste or co-product materials.
Orphan Mine Discharges- Regulated Facilities/Water	The Orphan Mine Discharges layer refers to those mine water discharges for which there are no responsible entities to provide treatment of the discharges, and those discharges that do not have a funding mechanism (e.g. trust fund) in place to cover perpetual treatment. Emphasis and priority for remediation is placed on discharges that have the potential for recycling and reuse (i.e. high volume) and those that have the potential for third party treatment or abatement using waste or co-product materials.
Radiation Facility - Regulated Facilities/Radiation	A Radiation Facility is a PADEP primary facility type related to the Radiation Protection Program. The sub-facility types related to radiation that are included in eMapPA are listed below. Note that Radioactive Material is not included on the external eMapPA website. Accelerator - Electronic machine producing high energy radiation. General Licensed Material - A General License is another radioactive material license. A General License utilizes Radiation Facility for the Primary Facility and uses General License material in lieu of radioactive materials (RAM) for the sub facility. Mammography Quality Standards Act Tube - Specialized X-ray equipment for mammography. Radioactive Material - a facility where radioactive material may be used or stored. X-ray Machine - A facility where X-ray machines other than accelerators are used.

Residual Waste Operation - Regulated Facilities/Waste	A Residual Waste Operation is a PADEP primary facility type related to the Waste Management Residual Waste Program. Residual waste is waste generated at an industrial, mining, or wastewater treatment facility. The sub-facility types related to residual waste that are included in eMapPA are: Generator, Impoundment, Incinerator, Land Application, Landfill, Processing Facility, and Transfer Station.
Sample Points - Regulated Facilities/Sample Information System	This data layer represents the locations where samples have been taken. This layer will not contain all sample locations and results in the Commonwealth because most of the older sample records do not contain information sufficient to determine the location of the sample.
Storage Tank Location - Regulated Facilities/Storage Tanks	A Storage Tank Location is a PADEP primary facility type, and its sole sub-facility on eMapPA is the storage tank itself. Storage tanks are aboveground or underground and are regulated under Chapter 245 pursuant to the Storage Tank and Spill Prevention Act. Storage tanks currently contain, have contained in the past, or will contain in the future, petroleum, or a regulated hazardous substance.
Toxic Release Inventory - Federal EPA Sites	The Toxic Release Inventory (TRI) is provided by the Environmental Protection Agency as a result of the Emergency Planning and Community Right-to-Know Act of 1986 and expanded by the Pollution Prevention Act of 1990. The layer contains points where toxic chemicals are stored. Industries are required to annually report the location and quantity of all toxic chemicals to EPA in an effort to prepare for chemical-spill related emergencies. For more information relating to Toxic Release Inventory, visit the Environmental Protection Agency's website.
Unconventional Wells - Regulated Facilities/Oil and Gas	An unconventional gas well is a bore hole drilled or being drilled for the purpose of or to be used for the production of natural gas from an unconventional formation. Unconventional formation is a geological shale formation existing below the base of the Elk Sandstone or its geologic equivalent stratigraphic interval where natural gas generally cannot be produced at economic flow rates or in economic volumes except by vertical or horizontal well bores stimulated by hydraulic fracture treatments or by using multilateral well bores or other techniques to expose more of the formation to the well bore.

Water Pollution Control Facility- Regulated Facilities/Water	A Water Pollution Control Facility is a PADEP primary facility type related to the Water Pollution Control Program. The sub-facility types related to Water Pollution Control that are included in eMapPA are: Agricultural Activities - The management and use of farming resources to produce crops, livestock, or poultry. Biosolids Treatment - Indicates that the facility treats sewage sludge to produce a material that can be beneficially used, biosolids. Compost/Processing - Indicates that the facility treats sewage sludge by composting to produce a material that can be beneficially used, biosolids. Conveyance System - Sewage system without treatment. Discharge Point - Discharge point to stream. Groundwater Monitoring Point. Internal Monitoring Point - Used to monitor internal processes - not a discharge. Land Discharge - Land application of wastewater. Manure Management - Activities related to or supporting storage, collection, handling, transport, application, planning, record keeping, generation or other manure management activities. Outfall structure - Outfall structure to stream. Pesticide Treatment Area - These SFs are created to address treatment areas that in reality are often an entire water body, such as a pond. The latitude/longitude coordinates are supposed to be entered at the mid-point or center of the treatment area. Pipeline or Conduit - Pipes or other smaller diameter conveyances that are used to transport or supply liquids or slurries from collection, storage or supply facilities or areas to other facilities or areas for storage, modification, or use. These can be for longer-term, medium-term, or short-term and would include design, capacity, maintenance, safety, inspection, accident and varying use, and weather considerations. Production Service Unit - Catch all sub-facility that covers a variety of industries participating in a multitude of activities such as concentrated animal feeding, pharmaceuticals, paper, steel, utilities, etc. The majority of PSUs are classified as Industrial Waste or Stormwater-Industrial (Primary Facility kind). Pump Station - Sewage pump station. Septage Land Application - Indicates that the septage hauler treats residential septage for land application, meaning that it can be applied to land as a soil amendment/fertilizer. Storage Unit - Storage of wastewater. Treatment Plant - Sewage or industrial wastewater treatment plant.

Attachment B Applicable USEPA Envirofacts Datasets

https://www.epa.gov/enviro/about-data

Brownfields-Cleanups	Accidents, spills, leaks, and past improper disposal and handling of hazardous materials and wastes have resulted in tens of thousands of sites across our country that have contaminated our land, water (groundwater and surface water), and air (indoor and outdoor). These contaminated sites can threaten human health as well as the environment. More information on Brownfields.
Cleanups in My Community (CIMC)	Cleanups in My Community is a mapping and listing tool that shows sites where pollution is or has been cleaned up throughout the United States. It maps, lists, and provides cleanup progress profiles for: * Sites, facilities and properties that have been contaminated by hazardous materials and are being, or have been, cleaned up under the Superfund, RCRA or Brownfields cleanup programs. * Federal facilities that have been contaminated by hazardous materials and are being, or have been, cleaned up under the Superfund or RCRA cleanup programs. More information on CIMC.
Resource Conservation and Recovery Act Information	Hazardous waste generators, transporters, treaters, storers, and disposers of hazardous waste are required to provide information on their activities to state environmental agencies. These agencies then provide the information to regional and national US Environmental Protection Agency (EPA) offices through the Resource Conservation and Recovery Act Information (RCRAInfo) System. Information on cleaning up after accidents or other activities that result in a release of hazardous materials to the water, air or land must also be reported through RCRAInfo. More information on RCRAInfo.
Superfund Enterprise Management System (SEMS)	Superfund is a program administered by the EPA to locate, investigate, and clean up uncontrolled hazardous waste sites throughout the United States. More information on SEMS.
Toxics Release Inventory (TRI)	The Toxics Release Inventory (TRI) tracks the management of over 650 toxic chemicals that pose a threat to human health and the environment. U.S. facilities in different industry sectors that manufacture, process, or otherwise use these chemicals in amounts above established levels must report how each chemical is managed through recycling, energy recovery, treatment, and environmental releases. (A “release” of a chemical means that it is emitted to the air or water or placed in some type of land disposal.) The information submitted by facilities to the EPA and states is compiled annually as the Toxics Release Inventory or TRI and is stored in a publicly accessible database. More information on TRI.
Toxic Substances Control Act (TSCA)	The Toxic Substances Control Act provides EPA with the authority to require reporting, record-keeping and testing requirements, and restrictions relating to chemical substances and/or mixtures. More information on TSCA.

RadNet	The RadNet (formerly the Environmental Radiation Ambient Monitoring System (ERAMS)) is a national network of monitoring stations that regularly collect air, precipitation, and drinking water samples for analysis of radioactivity. The RadNet network has been used to track environmental releases resulting from nuclear emergencies and to provide baseline data during routine conditions. Data generated from RadNet provides the information base for making decisions necessary to ensure the protection of public health. More information on RadNet.
Facility Registry Service	The Facility Registry Service (FRS) is a centrally managed database that identifies facilities, sites, or places subject to environmental regulations or of environmental interest. FRS creates high-quality, accurate, and authoritative facility identification records through rigorous verification and management procedures that incorporate information from program national systems, state master facility records, data collected from EPA's Central Data Exchange registrations and data management personnel. More information on FRS.

IB Brown Road Study Area and
2A Griffey Road Study Area
West Springfield, PA 16443

Inquiry Number: 7079489.2s
August 10, 2022

The EDR Radius Map™ Report with GeoCheck®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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Physical Setting Source Map Findings	A-9
Physical Setting Source Records Searched	PSGR-1

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E1527-21), the ASTM Standard Practice for Environmental Site Assessments for Forestland or Rural Property (E 2247-16), the ASTM Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process (E 1528-14) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

2A GRIFFEY ROAD STUDY AREA
WEST SPRINGFIELD, PA 16443

COORDINATES

Latitude (North):	41.9150990 - 41ˆ 54' 54.35''
Longitude (West):	80.4843040 - 80ˆ 29' 3.49''
Universal Tranverse Mercator:	Zone 17
UTM X (Meters):	542766.7
UTM Y (Meters):	4640265.0
Elevation:	818 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	14042455 EAST SPRINGFIELD, PA
Version Date:	2019
West Map:	14438533 CONNEAUT, OH
Version Date:	2019

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20150724
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
2A GRIFFEY ROAD STUDY AREA
WEST SPRINGFIELD, PA 16443

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Lists of Federal NPL (Superfund) sites

NPL ---- National Priority List
Proposed NPL ---- Proposed National Priority List Sites
NPL LIENS ---- Federal Superfund Liens

Lists of Federal Delisted NPL sites

Delisted NPL ---- National Priority List Deletions

Lists of Federal sites subject to CERCLA removals and CERCLA orders

FEDERAL FACILITY ---- Federal Facility Site Information listing
SEMS ---- Superfund Enterprise Management System

Lists of Federal CERCLA sites with NFRAP

SEMS-ARCHIVE ---- Superfund Enterprise Management System Archive

Lists of Federal RCRA facilities undergoing Corrective Action

CORRACTS ---- Corrective Action Report

Lists of Federal RCRA TSD facilities

RCRA-TSDF ---- RCRA - Treatment, Storage and Disposal

Lists of Federal RCRA generators

RCRA-LQG ---- RCRA - Large Quantity Generators
RCRA-SQG ---- RCRA - Small Quantity Generators
RCRA-VSQG ---- RCRA - Very Small Quantity Generators (Formerly Conditionally Exempt Small Quantity Generators)

Federal institutional controls / engineering controls registries

LUCIS ---- Land Use Control Information System

US ENG CONTROLS..... Engineering Controls Sites List
US INST CONTROLS..... Institutional Controls Sites List

Federal ERNS list

ERNS..... Emergency Response Notification System

Lists of state- and tribal (Superfund) equivalent sites

SHWS..... Hazardous Sites Cleanup Act Site List
HSCA..... HSCA Remedial Sites Listing

Lists of state and tribal landfills and solid waste disposal facilities

SWF/LF..... Operating Facilities

Lists of state and tribal leaking storage tanks

LAST..... Storage Tank Release Sites
LUST..... Storage Tank Release Sites
INDIAN LUST..... Leaking Underground Storage Tanks on Indian Land
UNREG LTANKS..... Unregulated Tank Cases

Lists of state and tribal registered storage tanks

FEMA UST..... Underground Storage Tank Listing
UST..... Listing of Pennsylvania Regulated Underground Storage Tanks
AST..... Listing of Pennsylvania Regulated Aboveground Storage Tanks
INDIAN UST..... Underground Storage Tanks on Indian Land

State and tribal institutional control / engineering control registries

ENG CONTROLS..... Engineering Controls Site Listing
INST CONTROL..... Institutional Controls Site Listing
AUL..... Environmental Covenants Listing

Lists of state and tribal voluntary cleanup sites

VCP..... Voluntary Cleanup Program Listing
INDIAN VCP..... Voluntary Cleanup Priority Listing

Lists of state and tribal brownfield sites

BROWNFIELDS..... Brownfields Sites

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS..... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

HIST LF..... Abandoned Landfill Inventory

EXECUTIVE SUMMARY

INDIAN ODI ..... Report on the Status of Open Dumps on Indian Lands
DEBRIS REGION 9 ..... Torres Martinez Reservation Illegal Dump Site Locations
ODI ..... Open Dump Inventory
IHS OPEN DUMPS ..... Open Dumps on Indian Land

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL ..... Delisted National Clandestine Laboratory Register
US CDL ..... National Clandestine Laboratory Register
PFAS ..... Sites With Known PFAS Contamination

Local Lists of Registered Storage Tanks

ARCHIVE UST ..... Archived Underground Storage Tank Sites
ARCHIVE AST ..... Archived Aboveground Storage Tank Sites

Local Land Records

LIENS 2 ..... CERCLA Lien Information
ACT 2-DEED ..... Act 2-Deed Acknowledgment Sites

Records of Emergency Release Reports

HMIRS ..... Hazardous Materials Information Reporting System
SPILLS ..... State spills

Other Ascertainable Records

RCRA NonGen / NLR ..... RCRA - Non Generators / No Longer Regulated
FUDS ..... Formerly Used Defense Sites
DOD ..... Department of Defense Sites
SCRD DRYCLEANERS ..... State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR ..... Financial Assurance Information
EPA WATCH LIST ..... EPA WATCH LIST
2020 COR ACTION ..... 2020 Corrective Action Program List
TSCA ..... Toxic Substances Control Act
TRIS ..... Toxic Chemical Release Inventory System
SSTS ..... Section 7 Tracking Systems
ROD ..... Records Of Decision
RMP ..... Risk Management Plans
RAATS ..... RCRA Administrative Action Tracking System
PRP ..... Potentially Responsible Parties
PADS ..... PCB Activity Database System
ICIS ..... Integrated Compliance Information System
FTTS ..... FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS ..... Material Licensing Tracking System
COAL ASH DOE ..... Steam-Electric Plant Operation Data
COAL ASH EPA ..... Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER ..... PCB Transformer Registration Database
RADINFO ..... Radiation Information Database
HIST FTTS ..... FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS ..... Incident and Accident Data
CONSENT ..... Superfund (CERCLA) Consent Decrees
INDIAN RESERV ..... Indian Reservations

FUSRAP ---- Formerly Utilized Sites Remedial Action Program
UMTRA ---- Uranium Mill Tailings Sites
LEAD SMELTERS ---- Lead Smelter Sites
US AIRS ---- Aerometric Information Retrieval System Facility Subsystem
US MINES ---- Mines Master Index File
ABANDONED MINES ---- Abandoned Mines
FINDS ---- Facility Index System/Facility Registry System
UXO ---- Unexploded Ordnance Sites
DOCKET HWC ---- Hazardous Waste Compliance Docket Listing
ECHO ---- Enforcement & Compliance History Information
FUELS PROGRAM ---- EPA Fuels Program Registered Listing
AIRS ---- Permit and Emissions Inventory Data
ASBESTOS ---- ASBESTOS
DRYCLEANERS ---- Drycleaner Facility Locations
MANIFEST ---- Manifest Information
MINES ---- MINES
NPDES ---- NPDES Permit Listing
UIC ---- Underground Injection Wells
MINES MRDS ---- Mineral Resources Data System

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP ---- EDR Proprietary Manufactured Gas Plants
EDR Hist Auto ---- EDR Exclusive Historical Auto Stations
EDR Hist Cleaner ---- EDR Exclusive Historical Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS ---- Recovered Government Archive State Hazardous Waste Facilities List
RGA LF ---- Recovered Government Archive Solid Waste Facilities List
RGA LUST ---- Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

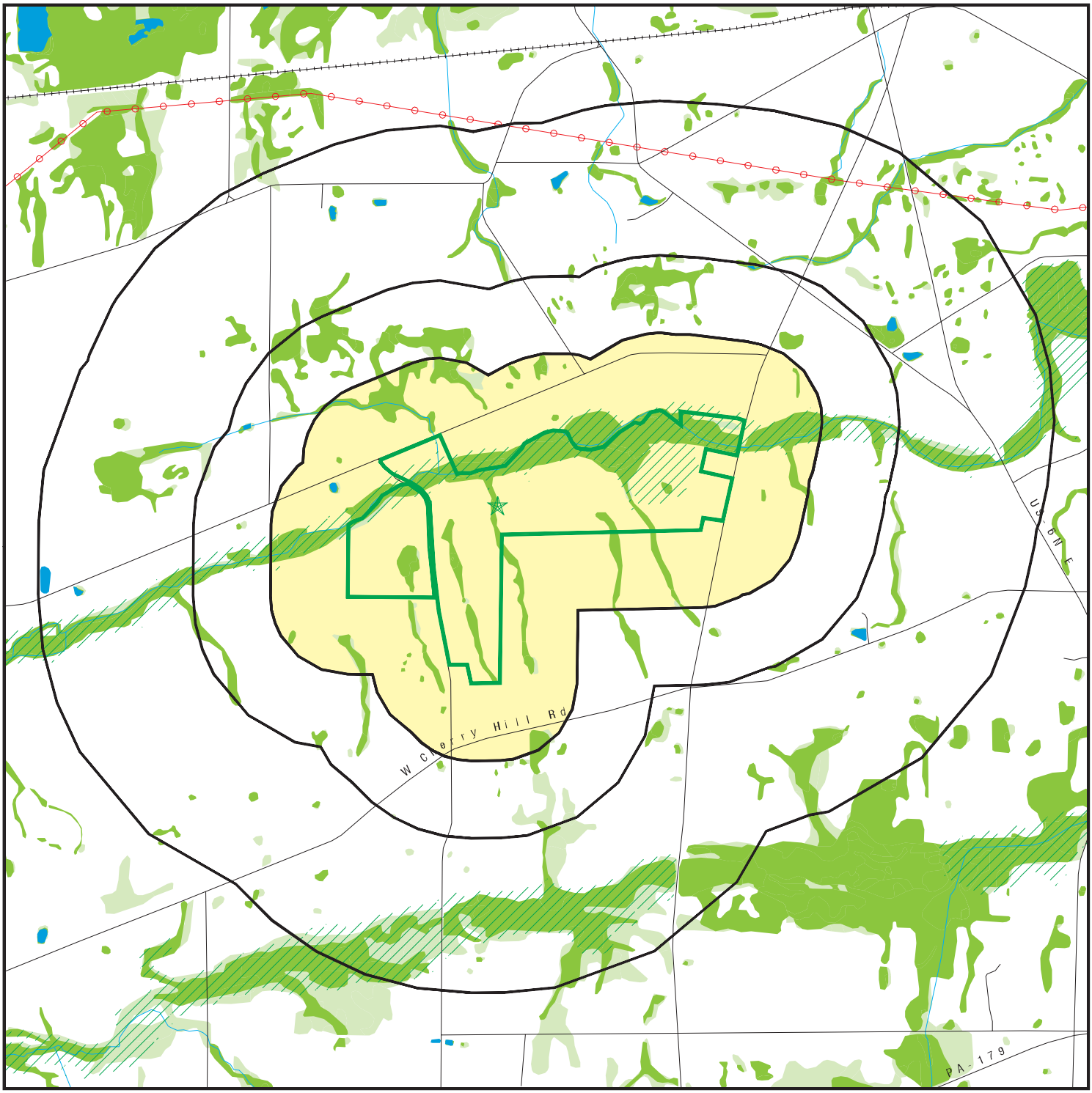
Surrounding sites were not identified.

Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

There were no unmapped sites in this report.

OVERVIEW MAP - 7079489.2S



0 1/4 1/2 1 Miles

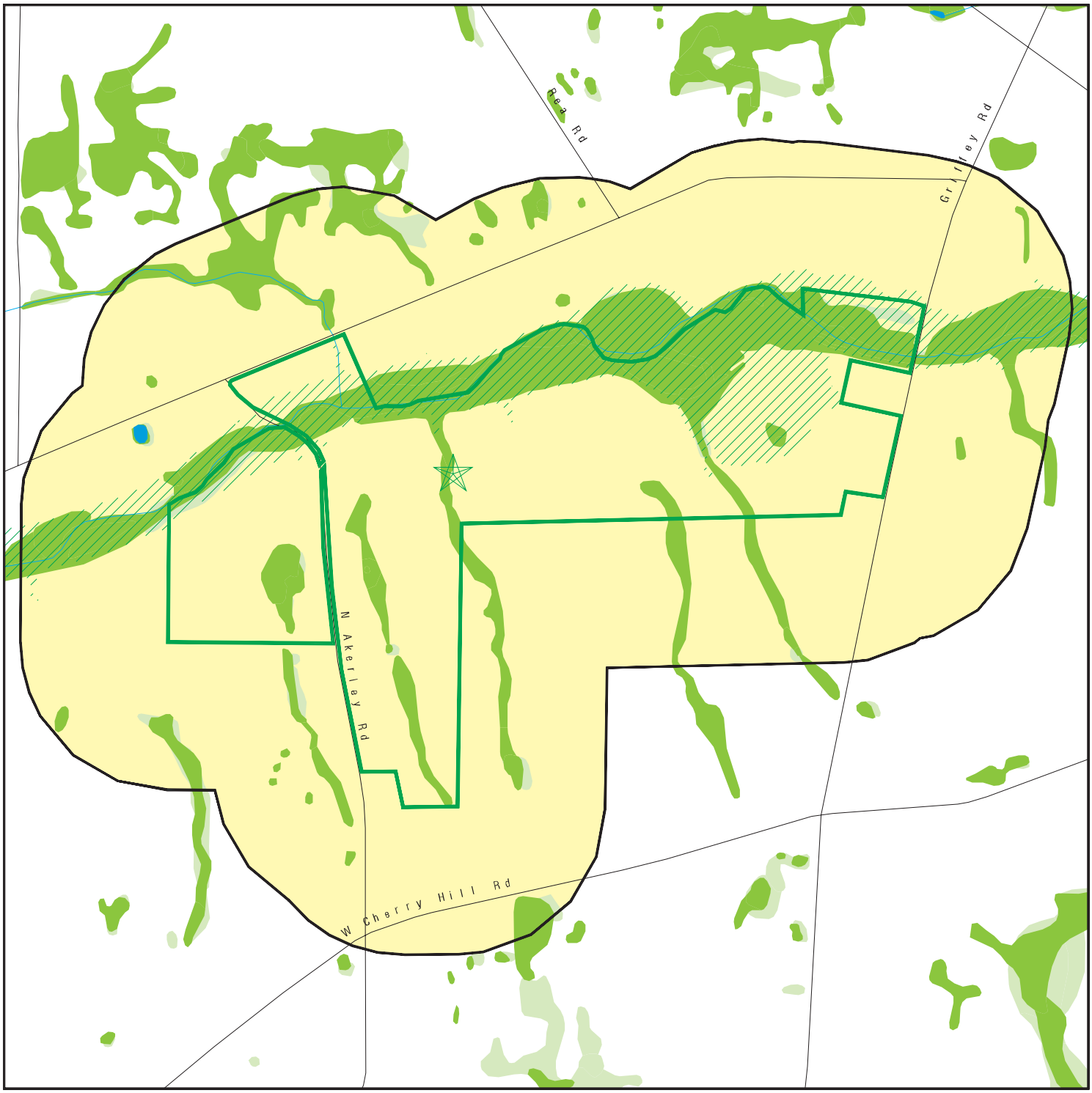
N

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Special Flood Hazard Area (1%)
- 0.2% Annual Chance Flood Hazard
- National Wetland Inventory
- State Wetlands

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	IB Brown Road Study Area and	CLIENT:	U.S. Army Corps of Engineers
ADDRESS:	2A Griffey Road Study Area West Springfield PA 16443	CONTACT:	Martin Jander
LAT/LONG:	41.915099 / 80.484304	INQUIRY #:	7079489.2s
		DATE:	August 10, 2022 4:50 pm

DETAIL MAP - 7079489.2S



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites

0 1/8 1/4 1/2 Miles

- Indian Reservations BIA
- Special Flood Hazard Area (1%)
- 0.2% Annual Chance Flood Hazard
- National Wetland Inventory
- State Wetlands

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	IB Brown Road Study Area and	CLIENT:	U.S. Army Corps of Engineers
ADDRESS:	2A Griffey Road Study Area West Springfield PA 16443	CONTACT:	Martin Jander
LAT/LONG:	41.915099 / 80.484304	INQUIRY #:	7079489.2s
		DATE:	August 10, 2022 4:50 pm

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Lists of Federal NPL (Superfund) sites								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	1.000		0	0	0	0	NR	0
Lists of Federal Delisted NPL sites								
Delisted NPL	1.000		0	0	0	0	NR	0
Lists of Federal sites subject to CERCLA removals and CERCLA orders								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	0	0	NR	NR	0
Lists of Federal CERCLA sites with NFRAP								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
Lists of Federal RCRA facilities undergoing Corrective Action								
CORRACTS	1.000		0	0	0	0	NR	0
Lists of Federal RCRA TSD facilities								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Lists of Federal RCRA generators								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-VSQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROLS	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	0.001		0	NR	NR	NR	NR	0
Lists of state- and tribal (Superfund) equivalent sites								
SHWS	1.000		0	0	0	0	NR	0
HSCA	1.000		0	0	0	0	NR	0
Lists of state and tribal landfills and solid waste disposal facilities								
SWF/LF	0.500		0	0	0	NR	NR	0
Lists of state and tribal leaking storage tanks								
LAST	0.500		0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
LUST	0.500		0	0	0	NR	NR	0
INDIAN LUST	0.500		0	0	0	NR	NR	0
UNREG LTANKS	0.500		0	0	0	NR	NR	0
Lists of state and tribal registered storage tanks								
FEMA UST	0.250		0	0	NR	NR	NR	0
UST	0.250		0	0	NR	NR	NR	0
AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal institutional control / engineering control registries								
ENG CONTROLS	0.500		0	0	0	NR	NR	0
INST CONTROL	0.500		0	0	0	NR	NR	0
AUL	0.500		0	0	0	NR	NR	0
Lists of state and tribal voluntary cleanup sites								
VCP	0.500		0	0	0	NR	NR	0
INDIAN VCP	0.500		0	0	0	NR	NR	0
Lists of state and tribal brownfield sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
HIST LF	0.500		0	0	0	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	0.001		0	NR	NR	NR	NR	0
US CDL	0.001		0	NR	NR	NR	NR	0
PFAS	0.500		0	0	0	NR	NR	0
Local Lists of Registered Storage Tanks								
ARCHIVE UST	0.250		0	0	NR	NR	NR	0
ARCHIVE AST	0.001		0	NR	NR	NR	NR	0
Local Land Records								
LIENS 2	0.001		0	NR	NR	NR	NR	0
ACT 2-DEED	0.500		0	0	0	NR	NR	0
Records of Emergency Release Reports								
HMIRS	0.001		0	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
SPILLS	0.001		0	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	0.001		0	NR	NR	NR	NR	0
EPA WATCH LIST	0.001		0	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	0.001		0	NR	NR	NR	NR	0
TRIS	0.001		0	NR	NR	NR	NR	0
SSTS	0.001		0	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	0.001		0	NR	NR	NR	NR	0
RAATS	0.001		0	NR	NR	NR	NR	0
PRP	0.001		0	NR	NR	NR	NR	0
PADS	0.001		0	NR	NR	NR	NR	0
ICIS	0.001		0	NR	NR	NR	NR	0
FTTS	0.001		0	NR	NR	NR	NR	0
MLTS	0.001		0	NR	NR	NR	NR	0
COAL ASH DOE	0.001		0	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	0.001		0	NR	NR	NR	NR	0
RADINFO	0.001		0	NR	NR	NR	NR	0
HIST FTTS	0.001		0	NR	NR	NR	NR	0
DOT OPS	0.001		0	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	0.001		0	NR	NR	NR	NR	0
US AIRS	0.001		0	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
ABANDONED MINES	0.250		0	0	NR	NR	NR	0
FINDS	0.001		0	NR	NR	NR	NR	0
UXO	1.000		0	0	0	0	NR	0
DOCKET HWC	0.001		0	NR	NR	NR	NR	0
ECHO	0.001		0	NR	NR	NR	NR	0
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
AIRS	0.001		0	NR	NR	NR	NR	0
ASBESTOS	0.001		0	NR	NR	NR	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
MANIFEST	0.250		0	0	NR	NR	NR	0
MINES	0.250		0	0	NR	NR	NR	0
NPDES	0.001		0	NR	NR	NR	NR	0
UIC	0.001		0	NR	NR	NR	NR	0
MINES MRDS	0.001		0	NR	NR	NR	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		0	NR	NR	NR	NR	0
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA HWS	0.001		0	NR	NR	NR	NR	0
RGA LF	0.001		0	NR	NR	NR	NR	0
RGA LUST	0.001		0	NR	NR	NR	NR	0
- Totals --		0	0	0	0	0	0	0

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

NO SITES FOUND

Count: 0 records.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
		NO SITES FOUND			

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Lists of Federal NPL (Superfund) sites

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 04/27/2022
Date Data Arrived at EDR: 05/05/2022
Date Made Active in Reports: 05/31/2022
Number of Days to Update: 26

Source: EPA
Telephone: N/A
Last EDR Contact: 08/02/2022
Next Scheduled EDR Contact: 10/10/2022
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 5
Telephone 312-886-6686

EPA Region 6
Telephone: 214-655-6659

EPA Region 7
Telephone: 913-551-7247

EPA Region 8
Telephone: 303-312-6774

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 04/27/2022
Date Data Arrived at EDR: 05/05/2022
Date Made Active in Reports: 05/31/2022
Number of Days to Update: 26

Source: EPA
Telephone: N/A
Last EDR Contact: 08/02/2022
Next Scheduled EDR Contact: 10/10/2022
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

Lists of Federal Delisted NPL sites

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 04/27/2022
Date Data Arrived at EDR: 05/05/2022
Date Made Active in Reports: 05/31/2022
Number of Days to Update: 26

Source: EPA
Telephone: N/A
Last EDR Contact: 08/02/2022
Next Scheduled EDR Contact: 10/10/2022
Data Release Frequency: Quarterly

Lists of Federal sites subject to CERCLA removals and CERCLA orders

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 05/25/2021
Date Data Arrived at EDR: 06/24/2021
Date Made Active in Reports: 09/20/2021
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 06/27/2022
Next Scheduled EDR Contact: 10/10/2022
Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 04/27/2022
Date Data Arrived at EDR: 05/05/2022
Date Made Active in Reports: 05/31/2022
Number of Days to Update: 26

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 08/02/2022
Next Scheduled EDR Contact: 10/24/2022
Data Release Frequency: Quarterly

Lists of Federal CERCLA sites with NFRAP

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 04/27/2022
Date Data Arrived at EDR: 05/05/2022
Date Made Active in Reports: 05/31/2022
Number of Days to Update: 26

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 08/02/2022
Next Scheduled EDR Contact: 10/24/2022
Data Release Frequency: Quarterly

Lists of Federal RCRA facilities undergoing Corrective Action

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 06/20/2022
Date Data Arrived at EDR: 06/21/2022
Date Made Active in Reports: 06/28/2022
Number of Days to Update: 7

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 06/21/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Quarterly

Lists of Federal RCRA TSD facilities

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 06/20/2022
Date Data Arrived at EDR: 06/21/2022
Date Made Active in Reports: 06/28/2022
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 800-438-2474
Last EDR Contact: 06/21/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Quarterly

Lists of Federal RCRA generators

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 06/20/2022
Date Data Arrived at EDR: 06/21/2022
Date Made Active in Reports: 06/28/2022
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 800-438-2474
Last EDR Contact: 06/21/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 06/20/2022
Date Data Arrived at EDR: 06/21/2022
Date Made Active in Reports: 06/28/2022
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 800-438-2474
Last EDR Contact: 06/21/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Quarterly

RCRA-VSQG: RCRA - Very Small Quantity Generators (Formerly Conditionally Exempt Small Quantity Generators)

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Very small quantity generators (VSQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 06/20/2022
Date Data Arrived at EDR: 06/21/2022
Date Made Active in Reports: 06/28/2022
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 800-438-2474
Last EDR Contact: 06/21/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Quarterly

Federal institutional controls / engineering controls registries

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 05/16/2022
Date Data Arrived at EDR: 05/19/2022
Date Made Active in Reports: 07/29/2022
Number of Days to Update: 71

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 08/03/2022
Next Scheduled EDR Contact: 11/21/2022
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 05/16/2022
Date Data Arrived at EDR: 05/24/2022
Date Made Active in Reports: 07/29/2022
Number of Days to Update: 66

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 05/24/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Varies

US INST CONTROLS: Institutional Controls Sites List

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 05/16/2022
Date Data Arrived at EDR: 05/24/2022
Date Made Active in Reports: 07/29/2022
Number of Days to Update: 66

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 05/04/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 06/14/2022
Date Data Arrived at EDR: 06/15/2022
Date Made Active in Reports: 06/21/2022
Number of Days to Update: 6

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 06/15/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Quarterly

Lists of state- and tribal (Superfund) equivalent sites

SHWS: Hazardous Sites Cleanup Act Site List

The Hazardous Sites Cleanup Act Site List includes sites listed on PA Priority List, sites delisted from PA Priority List, Interim Response Completed sites, and Sites Being Studied or Response Being Planned.

Date of Government Version: 04/12/2022
Date Data Arrived at EDR: 04/13/2022
Date Made Active in Reports: 07/08/2022
Number of Days to Update: 86

Source: Department Environmental Protection
Telephone: 717-783-7816
Last EDR Contact: 07/12/2022
Next Scheduled EDR Contact: 10/24/2022
Data Release Frequency: Quarterly

HSCA: HSCA Remedial Sites Listing

A list of remedial sites on the PA Priority List. This is the PA state equivalent of the federal NPL superfund list.

Date of Government Version: 06/30/2021
Date Data Arrived at EDR: 01/13/2022
Date Made Active in Reports: 03/24/2022
Number of Days to Update: 70

Source: Department of Environmental Protection
Telephone: 717-783-7816
Last EDR Contact: 07/14/2021
Next Scheduled EDR Contact: 10/24/2022
Data Release Frequency: Annually

Lists of state and tribal landfills and solid waste disposal facilities

SWF/LF: Operating Facilities

The listing includes Municipal Waste Landfills, Construction/Demolition Waste Landfills and Waste-to-Energy Facilities.

Date of Government Version: 02/08/2022
Date Data Arrived at EDR: 03/23/2022
Date Made Active in Reports: 05/17/2022
Number of Days to Update: 55

Source: Department of Environmental Protection
Telephone: 717-787-7564
Last EDR Contact: 05/16/2022
Next Scheduled EDR Contact: 08/29/2022
Data Release Frequency: Semi-Annually

Lists of state and tribal leaking storage tanks

LUST: Storage Tank Release Sites

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 03/09/2022
Date Data Arrived at EDR: 03/10/2022
Date Made Active in Reports: 06/07/2022
Number of Days to Update: 89

Source: Department of Environmental Protection
Telephone: 717-783-7509
Last EDR Contact: 06/08/2022
Next Scheduled EDR Contact: 09/19/2022
Data Release Frequency: Quarterly

LAST: Storage Tank Release Sites

Leaking Aboveground Storage Tank Incident Reports.

Date of Government Version: 03/09/2022
Date Data Arrived at EDR: 03/10/2022
Date Made Active in Reports: 06/07/2022
Number of Days to Update: 89

Source: Department of Environmental Protection
Telephone: 717-783-7509
Last EDR Contact: 06/08/2022
Next Scheduled EDR Contact: 09/19/2022
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 04/28/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88
Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 05/28/2021
Date Data Arrived at EDR: 06/22/2021
Date Made Active in Reports: 09/20/2021
Number of Days to Update: 90
Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

UNREG LTANKS: Unregulated Tank Cases
Leaking storage tank cases from unregulated storage tanks.

Date of Government Version: 04/12/2002
Date Data Arrived at EDR: 08/14/2003
Date Made Active in Reports: 08/29/2003
Number of Days to Update: 15
Source: Department of Environmental Protection
Telephone: 717-783-7509
Last EDR Contact: 08/14/2003
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Lists of state and tribal registered storage tanks

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 10/14/2021
Date Data Arrived at EDR: 11/05/2021
Date Made Active in Reports: 02/01/2022
Number of Days to Update: 88
Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 06/29/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: Varies

UST: Listing of Pennsylvania Regulated Underground Storage Tanks
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 03/01/2022
Date Data Arrived at EDR: 03/09/2022
Date Made Active in Reports: 06/06/2022
Number of Days to Update: 89
Source: Department of Environmental Protection
Telephone: 717-772-5599
Last EDR Contact: 06/08/2022
Next Scheduled EDR Contact: 09/19/2022
Data Release Frequency: Varies

AST: Listing of Pennsylvania Regulated Aboveground Storage Tanks
Registered Aboveground Storage Tanks.

Date of Government Version: 03/01/2022
Date Data Arrived at EDR: 03/09/2022
Date Made Active in Reports: 06/06/2022
Number of Days to Update: 89
Source: Department of Environmental Protection
Telephone: 717-772-5599
Last EDR Contact: 06/08/2022
Next Scheduled EDR Contact: 09/19/2022
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 05/28/2021
Date Data Arrived at EDR: 06/22/2021
Date Made Active in Reports: 09/20/2021
Number of Days to Update: 90

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 04/06/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 10/14/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 11/15/2021
Date Made Active in Reports: 02/08/2022
Number of Days to Update: 85

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 06/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

State and tribal institutional control / engineering control registries

ENG CONTROLS: Engineering Controls Site Listing

Under the Land Recycling Act (Act 2) persons who perform a site cleanup using the site-specific standard or the special industrial area standard may use engineering or institutional controls as part of the response action. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 05/15/2008
Date Data Arrived at EDR: 05/16/2008
Date Made Active in Reports: 06/12/2008
Number of Days to Update: 27

Source: Department of Environmental Protection
Telephone: 717-783-9470
Last EDR Contact: 07/06/2022
Next Scheduled EDR Contact: 10/24/2022
Data Release Frequency: No Update Planned

AUL: Environmental Covenants Listing

A listing of sites with environmental covenants.

Date of Government Version: 04/12/2022
Date Data Arrived at EDR: 04/13/2022
Date Made Active in Reports: 07/08/2022
Number of Days to Update: 86

Source: Department of Environmental Protection
Telephone: 717-783-7509
Last EDR Contact: 07/12/2022
Next Scheduled EDR Contact: 10/24/2022
Data Release Frequency: Quarterly

INST CONTROL: Institutional Controls Site Listing

Under the Land Recycling Act (Act 2) persons who perform a site cleanup using the site-specific standard or the special industrial area standard may use engineering or institutional controls as part of the response action. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 05/15/2008
Date Data Arrived at EDR: 05/16/2008
Date Made Active in Reports: 06/12/2008
Number of Days to Update: 27

Source: Department of Environmental Protection
Telephone: 717-783-9470
Last EDR Contact: 07/06/2022
Next Scheduled EDR Contact: 10/24/2022
Data Release Frequency: No Update Planned

Lists of state and tribal voluntary cleanup sites

VCP: Voluntary Cleanup Program Sites

The VCP listings included Completed Sites, Sites in Progress and Act 2 Non-Use Aquifer Determinations Sites. Formerly known as the Act 2, the Land Recycling Program encourages the voluntary cleanup and reuse of contaminated commercial and industrial sites.

Date of Government Version: 04/05/2022
Date Data Arrived at EDR: 04/05/2022
Date Made Active in Reports: 06/29/2022
Number of Days to Update: 85

Source: Department of Environmental Protection
Telephone: 717-783-2388
Last EDR Contact: 07/06/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: Quarterly

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 07/08/2021
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

INDIAN VCP R1: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 06/15/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Varies

Lists of state and tribal brownfield sites

BROWNFIELDS: Brownfields Sites

Brownfields are generally defined as abandoned or underused industrial or commercial properties where redevelopment is complicated by actual or perceived environmental contamination. Brownfields vary in size, location, age and past use. They can range from a small, abandoned corner gas station to a large, multi-acre former manufacturing plant that has been closed for years.

Date of Government Version: 04/12/2022
Date Data Arrived at EDR: 04/13/2022
Date Made Active in Reports: 07/08/2022
Number of Days to Update: 86

Source: Department of Environmental Protection
Telephone: 717-783-1566
Last EDR Contact: 07/12/2022
Next Scheduled EDR Contact: 10/24/2022
Data Release Frequency: Quarterly

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 02/23/2022
Date Data Arrived at EDR: 03/10/2022
Date Made Active in Reports: 03/10/2022
Number of Days to Update: 0

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 08/08/2022
Next Scheduled EDR Contact: 09/26/2022
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

HIST LF ALI: Abandoned Landfill Inventory

The report provides facility information recorded in the Pennsylvania Department of Environmental Protection ALI database. Some of this information has been abstracted from old records and may not accurately reflect the current conditions and status at these facilities

Date of Government Version: 04/07/2022
Date Data Arrived at EDR: 04/07/2022
Date Made Active in Reports: 07/06/2022
Number of Days to Update: 90

Source: Department of Environmental Protection
Telephone: 717-787-7564
Last EDR Contact: 03/23/2022
Next Scheduled EDR Contact: 07/18/2022
Data Release Frequency: No Update Planned

HIST LF INVENTORY: Facility Inventory

A listing of solid waste facilities. This listing is no longer updated or maintained by the Department of Environmental Protection. At the time the listing was available, the DEP?s name was the Department of Environmental Resources.

Date of Government Version: 06/02/1999
Date Data Arrived at EDR: 07/12/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 30

Source: Department of Environmental Protection
Telephone: 717-787-7381
Last EDR Contact: 09/19/2005
Next Scheduled EDR Contact: 12/19/2005
Data Release Frequency: No Update Planned

HIST LF INACTIVE: Inactive Facilities List

A listing of inactive non-hazardous facilities (10000 & 300000 series). This listing is no longer updated or maintained by the Department of Environmental Protection. At the time the listing was available, the DEP?s name was the Department of Environmental Resources.

Date of Government Version: 12/20/1994
Date Data Arrived at EDR: 07/12/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 30

Source: Department of Environmental Protection
Telephone: 717-787-7381
Last EDR Contact: 06/21/2005
Next Scheduled EDR Contact: 12/19/2005
Data Release Frequency: No Update Planned

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands

Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 07/21/2022
Next Scheduled EDR Contact: 11/07/2022
Data Release Frequency: Varies

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 07/12/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: No Update Planned

IHS OPEN DUMPS: Open Dumps on Indian Land

A listing of all open dumps located on Indian Land in the United States.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 08/06/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 176

Source: Department of Health & Human Serivces, Indian Health Service
Telephone: 301-443-1452
Last EDR Contact: 07/21/2022
Next Scheduled EDR Contact: 11/07/2022
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 04/30/2022
Date Data Arrived at EDR: 05/24/2022
Date Made Active in Reports: 07/29/2022
Number of Days to Update: 66

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/24/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: No Update Planned

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 04/30/2022
Date Data Arrived at EDR: 05/24/2022
Date Made Active in Reports: 07/29/2022
Number of Days to Update: 66

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/24/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Quarterly

PFAS: Sites With Known PFAS Contamination

Perfluoroalkyl and polyfluoroalkyl substances (PFAS) are man-made chemicals, are resistant to heat, water and oil, and persist in the environment and the human body. PFAS are not found naturally in the environment. They have been used to make cookware, carpets, clothing, fabrics for furniture, paper packaging for food, and other materials that are resistant to water, grease, or stains. They are also used in firefighting foams and in a number of industrial processes.

Date of Government Version: 11/23/2021
Date Data Arrived at EDR: 12/22/2021
Date Made Active in Reports: 03/15/2022
Number of Days to Update: 83

Source: Department of Environmental Protection
Telephone: 717-787-4728
Last EDR Contact: 06/23/2022
Next Scheduled EDR Contact: 09/26/2022
Data Release Frequency: Varies

Local Lists of Registered Storage Tanks

ARCHIVE UST: Archived Underground Storage Tank Sites

The list includes tanks storing highly hazardous substances that were removed from the DEP's Storage Tank Information database because of the Department's policy on sensitive information. The list also may include tanks that are removed or permanently closed.

Date of Government Version: 03/09/2022
Date Data Arrived at EDR: 03/10/2022
Date Made Active in Reports: 06/06/2022
Number of Days to Update: 88

Source: Department of Environmental Protection
Telephone: 717-772-5599
Last EDR Contact: 06/08/2022
Next Scheduled EDR Contact: 09/19/2022
Data Release Frequency: Varies

ARCHIVE AST: Archived Aboveground Storage Tank Sites

The list includes aboveground tanks with a capacity greater than 21,000 gallons that were removed from the DEP's Storage Tank Information database because of the Department's policy on sensitive information. The list also may include tanks that are removed or permanently closed.

Date of Government Version: 03/09/2022
Date Data Arrived at EDR: 03/10/2022
Date Made Active in Reports: 06/06/2022
Number of Days to Update: 88

Source: Department of Environmental Protection
Telephone: 717-772-5599
Last EDR Contact: 06/08/2022
Next Scheduled EDR Contact: 09/19/2022
Data Release Frequency: Varies

Local Land Records

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 04/27/2022
Date Data Arrived at EDR: 05/05/2022
Date Made Active in Reports: 05/31/2022
Number of Days to Update: 26

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 08/02/2022
Next Scheduled EDR Contact: 10/10/2022
Data Release Frequency: Semi-Annually

ACT 2-DEED: Act 2-Deed Acknowledgment Sites

This listing pertains to sites where the Department has approved a cleanup requiring a deed acknowledgment under Act 2. This list includes sites remediated to a non-residential Statewide health standard (Section 303(g)); all sites demonstrating attainment of a Site-specific standard (Section 304(m)); and sites being remediated as a special industrial area (Section 305(g)). Persons who remediated a site to a standard that requires a deed acknowledgment shall comply with the requirements of the Solid Waste Management Act or the Hazardous Sites Cleanup Act, as referenced in Act 2. These statutes require a property description section in the deed concerning the hazardous substance disposal on the site. The location of disposed hazardous substances and a description of the type of hazardous substances disposed on the site shall be included in the deed acknowledgment. A deed acknowledgment is required at the time of conveyance of the property.

Date of Government Version: 04/23/2010
Date Data Arrived at EDR: 04/28/2010
Date Made Active in Reports: 04/30/2010
Number of Days to Update: 2

Source: Department of Environmental Protection
Telephone: 717-783-9470
Last EDR Contact: 07/22/2011
Next Scheduled EDR Contact: 11/07/2011
Data Release Frequency: Varies

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 03/21/2022
Date Data Arrived at EDR: 03/21/2022
Date Made Active in Reports: 06/14/2022
Number of Days to Update: 85

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 06/21/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Quarterly

SPILLS: State spills

A listing of hazardous material incidents.

Date of Government Version: 04/20/2022
Date Data Arrived at EDR: 04/29/2022
Date Made Active in Reports: 07/19/2022
Number of Days to Update: 81

Source: DEP, Emergency Response
Telephone: 717-787-5715
Last EDR Contact: 07/27/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: Semi-Annually

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 06/20/2022
Date Data Arrived at EDR: 06/21/2022
Date Made Active in Reports: 06/28/2022
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 800-438-2474
Last EDR Contact: 06/21/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Quarterly

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 05/11/2022
Date Data Arrived at EDR: 05/17/2022
Date Made Active in Reports: 07/29/2022
Number of Days to Update: 73

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 05/17/2022
Next Scheduled EDR Contact: 08/29/2022
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 06/07/2021
Date Data Arrived at EDR: 07/13/2021
Date Made Active in Reports: 03/09/2022
Number of Days to Update: 239

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 07/13/2022
Next Scheduled EDR Contact: 10/24/2022
Data Release Frequency: Varies

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 04/02/2018
Date Data Arrived at EDR: 04/11/2018
Date Made Active in Reports: 11/06/2019
Number of Days to Update: 574

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 07/08/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 01/01/2017
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 08/03/2022
Next Scheduled EDR Contact: 11/21/2022
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 03/21/2022
Date Data Arrived at EDR: 03/21/2022
Date Made Active in Reports: 06/14/2022
Number of Days to Update: 85

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 06/21/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 07/29/2022
Next Scheduled EDR Contact: 11/14/2022
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 09/30/2017
Date Data Arrived at EDR: 05/08/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 73

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 08/04/2022
Next Scheduled EDR Contact: 11/14/2022
Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 06/17/2020
Date Made Active in Reports: 09/10/2020
Number of Days to Update: 85

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 06/14/2022
Next Scheduled EDR Contact: 09/26/2022
Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2018
Date Data Arrived at EDR: 08/14/2020
Date Made Active in Reports: 11/04/2020
Number of Days to Update: 82

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 05/20/2022
Next Scheduled EDR Contact: 08/29/2022
Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 07/18/2022
Date Data Arrived at EDR: 07/18/2022
Date Made Active in Reports: 07/29/2022
Number of Days to Update: 11

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 07/18/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 04/27/2022
Date Data Arrived at EDR: 05/05/2022
Date Made Active in Reports: 05/31/2022
Number of Days to Update: 26

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 08/02/2022
Next Scheduled EDR Contact: 09/12/2022
Data Release Frequency: Annually

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 04/27/2022
Date Data Arrived at EDR: 05/04/2022
Date Made Active in Reports: 05/10/2022
Number of Days to Update: 6

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 07/14/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 01/25/2022
Date Data Arrived at EDR: 02/03/2022
Date Made Active in Reports: 02/25/2022
Number of Days to Update: 22

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 08/02/2022
Next Scheduled EDR Contact: 11/14/2022
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 01/20/2022
Date Data Arrived at EDR: 01/20/2022
Date Made Active in Reports: 03/25/2022
Number of Days to Update: 64

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 07/08/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/18/2016
Date Data Arrived at EDR: 11/23/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 79

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 06/28/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: Quarterly

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: No Update Planned

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: No Update Planned

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 03/11/2022
Date Data Arrived at EDR: 03/15/2022
Date Made Active in Reports: 06/14/2022
Number of Days to Update: 91

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 07/13/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2020
Date Data Arrived at EDR: 11/30/2021
Date Made Active in Reports: 02/22/2022
Number of Days to Update: 84

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 06/02/2022
Next Scheduled EDR Contact: 09/12/2022
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 01/12/2017
Date Data Arrived at EDR: 03/05/2019
Date Made Active in Reports: 11/11/2019
Number of Days to Update: 251
Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 05/25/2022
Next Scheduled EDR Contact: 09/12/2022
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 09/13/2019
Date Data Arrived at EDR: 11/06/2019
Date Made Active in Reports: 02/10/2020
Number of Days to Update: 96
Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 08/04/2022
Next Scheduled EDR Contact: 11/14/2022
Data Release Frequency: Varies

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 07/01/2019
Date Data Arrived at EDR: 07/01/2019
Date Made Active in Reports: 09/23/2019
Number of Days to Update: 84
Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 06/23/2022
Next Scheduled EDR Contact: 10/10/2022
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data
Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 01/02/2020
Date Data Arrived at EDR: 01/28/2020
Date Made Active in Reports: 04/17/2020
Number of Days to Update: 80

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 07/21/2022
Next Scheduled EDR Contact: 11/07/2022
Data Release Frequency: Quarterly

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 03/31/2022
Date Data Arrived at EDR: 04/14/2022
Date Made Active in Reports: 07/12/2022
Number of Days to Update: 89

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 06/29/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2019
Date Data Arrived at EDR: 03/02/2022
Date Made Active in Reports: 03/25/2022
Number of Days to Update: 23

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 06/21/2022
Next Scheduled EDR Contact: 10/03/2022
Data Release Frequency: Biennially

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 07/14/2015
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 546

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 07/08/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program

DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 07/26/2021
Date Data Arrived at EDR: 07/27/2021
Date Made Active in Reports: 10/22/2021
Number of Days to Update: 87

Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 07/26/2022
Next Scheduled EDR Contact: 11/14/2022
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 08/30/2019
Date Data Arrived at EDR: 11/15/2019
Date Made Active in Reports: 01/28/2020
Number of Days to Update: 74

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 05/16/2022
Next Scheduled EDR Contact: 08/29/2022
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites
A listing of former lead smelter site locations.

Date of Government Version: 04/27/2022
Date Data Arrived at EDR: 05/05/2022
Date Made Active in Reports: 05/31/2022
Number of Days to Update: 26

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 08/01/2022
Next Scheduled EDR Contact: 10/10/2022
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites
A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)
The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data
A listing of minor source facilities.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

MINES VIOLATIONS: MSHA Violation Assessment Data
Mines violation and assessment information. Department of Labor, Mine Safety & Health Administration.

Date of Government Version: 03/21/2022
Date Data Arrived at EDR: 03/22/2022
Date Made Active in Reports: 03/25/2022
Number of Days to Update: 3

Source: DOL, Mine Safety & Health Admi
Telephone: 202-693-9424
Last EDR Contact: 08/02/2022
Next Scheduled EDR Contact: 09/12/2022
Data Release Frequency: Quarterly

US MINES: Mines Master Index File
Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 05/02/2022
Date Data Arrived at EDR: 05/25/2022
Date Made Active in Reports: 07/29/2022
Number of Days to Update: 65

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 05/25/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Semi-Annually

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing

This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 05/06/2020
Date Data Arrived at EDR: 05/27/2020
Date Made Active in Reports: 08/13/2020
Number of Days to Update: 78

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 05/27/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing

Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 05/27/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Varies

ABANDONED MINES: Abandoned Mines

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 03/10/2022
Date Data Arrived at EDR: 03/10/2022
Date Made Active in Reports: 06/14/2022
Number of Days to Update: 96

Source: Department of Interior
Telephone: 202-208-2609
Last EDR Contact: 06/14/2022
Next Scheduled EDR Contact: 09/19/2022
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 05/13/2022
Date Data Arrived at EDR: 05/18/2022
Date Made Active in Reports: 05/31/2022
Number of Days to Update: 13

Source: EPA
Telephone: (215) 814-5000
Last EDR Contact: 05/18/2022
Next Scheduled EDR Contact: 09/12/2022
Data Release Frequency: Quarterly

UXO: Unexploded Ordnance Sites

A listing of unexploded ordnance site locations

Date of Government Version: 12/31/2020
Date Data Arrived at EDR: 01/11/2022
Date Made Active in Reports: 02/14/2022
Number of Days to Update: 34

Source: Department of Defense
Telephone: 703-704-1564
Last EDR Contact: 07/07/2022
Next Scheduled EDR Contact: 10/24/2022
Data Release Frequency: Varies

ECHO: Enforcement & Compliance History Information

ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 04/02/2022
Date Data Arrived at EDR: 04/05/2022
Date Made Active in Reports: 06/28/2022
Number of Days to Update: 84

Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 07/01/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: Quarterly

DOCKET HWC: Hazardous Waste Compliance Docket Listing
A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 05/06/2021
Date Data Arrived at EDR: 05/21/2021
Date Made Active in Reports: 08/11/2021
Number of Days to Update: 82

Source: Environmental Protection Agency
Telephone: 202-564-0527
Last EDR Contact: 05/19/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Varies

FUELS PROGRAM: EPA Fuels Program Registered Listing
This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 05/16/2022
Date Data Arrived at EDR: 05/17/2022
Date Made Active in Reports: 07/29/2022
Number of Days to Update: 73

Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 05/17/2022
Next Scheduled EDR Contact: 08/29/2022
Data Release Frequency: Quarterly

AIRS: Permit and Emissions Inventory Data
Permit and emissions inventory data.

Date of Government Version: 03/15/2022
Date Data Arrived at EDR: 03/16/2022
Date Made Active in Reports: 06/10/2022
Number of Days to Update: 86

Source: Department of Environmental Protection
Telephone: 717-787-9702
Last EDR Contact: 06/14/2022
Next Scheduled EDR Contact: 09/26/2022
Data Release Frequency: Annually

ASBESTOS: Asbestos Notification Listing
Asbestos sites

Date of Government Version: 06/01/2022
Date Data Arrived at EDR: 06/01/2022
Date Made Active in Reports: 06/13/2022
Number of Days to Update: 12

Source: Department of Labor & Industry
Telephone: 717-703-1092
Last EDR Contact: 06/01/2022
Next Scheduled EDR Contact: 09/12/2022
Data Release Frequency: Varies

DRYCLEANERS: Drycleaner Facility Locations
A listing of drycleaner facility locations.

Date of Government Version: 03/15/2022
Date Data Arrived at EDR: 03/16/2022
Date Made Active in Reports: 06/13/2022
Number of Days to Update: 89

Source: Department of Environmental Protection
Telephone: 717-787-9702
Last EDR Contact: 06/14/2022
Next Scheduled EDR Contact: 09/26/2022
Data Release Frequency: Quarterly

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 06/30/2018
Date Data Arrived at EDR: 07/19/2019
Date Made Active in Reports: 09/10/2019
Number of Days to Update: 53

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 07/06/2022
Next Scheduled EDR Contact: 10/24/2022
Data Release Frequency: Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

MINES: Abandoned Mine Land Inventory
This data set portrays the approximate location of Abandoned Mine Land Problem Areas containing public health, safety, and public welfare problems created by past coal mining.

Date of Government Version: 04/07/2022
Date Data Arrived at EDR: 04/20/2022
Date Made Active in Reports: 07/13/2022
Number of Days to Update: 84
Source: PASDA
Telephone: 814-863-0104
Last EDR Contact: 07/18/2022
Next Scheduled EDR Contact: 10/31/2022
Data Release Frequency: Semi-Annually

NPDES: NPDES Permit Listing
A listing of facilities with an NPDES permit.

Date of Government Version: 05/31/2022
Date Data Arrived at EDR: 05/31/2022
Date Made Active in Reports: 06/13/2022
Number of Days to Update: 13
Source: Department of Environmental Protection
Telephone: 717-787-9642
Last EDR Contact: 05/31/2022
Next Scheduled EDR Contact: 09/12/2022
Data Release Frequency: Varies

UIC: Underground Injection Wells
A listing of underground injection well locations.

Date of Government Version: 03/15/2022
Date Data Arrived at EDR: 03/16/2022
Date Made Active in Reports: 06/13/2022
Number of Days to Update: 89
Source: Department of Environmental Protection
Telephone: 717-783-7209
Last EDR Contact: 06/14/2022
Next Scheduled EDR Contact: 09/26/2022
Data Release Frequency: Quarterly

PCS ENF: Enforcement data
No description is available for this data

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 02/05/2015
Date Made Active in Reports: 03/06/2015
Number of Days to Update: 29
Source: EPA
Telephone: 202-564-2497
Last EDR Contact: 06/28/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: Varies

PCS: Permit Compliance System
PCS is a computerized management information system that contains data on National Pollutant Discharge Elimination System (NPDES) permit holding facilities. PCS tracks the permit, compliance, and enforcement status of NPDES facilities.

Date of Government Version: 07/14/2011
Date Data Arrived at EDR: 08/05/2011
Date Made Active in Reports: 09/29/2011
Number of Days to Update: 55
Source: EPA, Office of Water
Telephone: 202-564-2496
Last EDR Contact: 06/28/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: Semi-Annually

PCS INACTIVE: Listing of Inactive PCS Permits
An inactive permit is a facility that has shut down or is no longer discharging.

Date of Government Version: 11/05/2014
Date Data Arrived at EDR: 01/06/2015
Date Made Active in Reports: 05/06/2015
Number of Days to Update: 120
Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 06/28/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: Semi-Annually

MINES MRDS: Mineral Resources Data System
Mineral Resources Data System

Date of Government Version: 04/06/2018
Date Data Arrived at EDR: 10/21/2019
Date Made Active in Reports: 10/24/2019
Number of Days to Update: 3

Source: USGS
Telephone: 703-648-6533
Last EDR Contact: 05/27/2022
Next Scheduled EDR Contact: 09/05/2022
Data Release Frequency: Varies

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historical Auto Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historical Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS: Recovered Government Archive State Hazardous Waste Facilities List

The EDR Recovered Government Archive State Hazardous Waste database provides a list of SHWS incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department Environmental Protection in Pennsylvania.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/30/2013
Number of Days to Update: 182

Source: Department Environmental Protection
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department Environmental Protection in Pennsylvania.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/10/2014
Number of Days to Update: 193

Source: Department Environmental Protection
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department Environmental Protection in Pennsylvania.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/30/2013
Number of Days to Update: 182

Source: Department Environmental Protection
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data

Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 05/08/2022
Date Data Arrived at EDR: 05/09/2022
Date Made Active in Reports: 07/28/2022
Number of Days to Update: 80

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 08/08/2022
Next Scheduled EDR Contact: 11/21/2022
Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2018
Date Data Arrived at EDR: 04/10/2019
Date Made Active in Reports: 05/16/2019
Number of Days to Update: 36

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 06/28/2022
Next Scheduled EDR Contact: 10/17/2022
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data

Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 01/01/2019
Date Data Arrived at EDR: 10/29/2021
Date Made Active in Reports: 01/19/2022
Number of Days to Update: 82

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 07/29/2022
Next Scheduled EDR Contact: 11/07/2022
Data Release Frequency: Quarterly

RI MANIFEST: Manifest information

Hazardous waste manifest information

Date of Government Version: 12/31/2020
Date Data Arrived at EDR: 11/30/2021
Date Made Active in Reports: 02/18/2022
Number of Days to Update: 80

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 05/16/2022
Next Scheduled EDR Contact: 08/29/2022
Data Release Frequency: Annually

VT MANIFEST: Hazardous Waste Manifest Data

Hazardous waste manifest information.

Date of Government Version: 10/28/2019
Date Data Arrived at EDR: 10/29/2019
Date Made Active in Reports: 01/09/2020
Number of Days to Update: 72

Source: Department of Environmental Conservation
Telephone: 802-241-3443
Last EDR Contact: 07/12/2022
Next Scheduled EDR Contact: 10/24/2022
Data Release Frequency: Annually

WI MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 05/31/2018
Date Data Arrived at EDR: 06/19/2019
Date Made Active in Reports: 09/03/2019
Number of Days to Update: 76

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 06/03/2022
Next Scheduled EDR Contact: 09/19/2022
Data Release Frequency: Annually

Oil/Gas Pipelines

Source: Endeavor Business Media

Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by Endeavor Business Media. This information is provided on a best effort basis and Endeavor Business Media does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of Endeavor Business Media.

Electric Power Transmission Line Data

Source: Endeavor Business Media

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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:

Source: American Hospital Association, Inc.
Telephone: 312-280-5991

The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing

Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000

A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.
Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.
Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.
Daycare Centers: Child Care Facility List
Source: Department of Public Welfare
Telephone: 717-783-3856

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory
Source: Pennsylvania Spatial Data Access
Telephone: 610-344-6105

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

STREET AND ADDRESS INFORMATION

GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

IB BROWN ROAD STUDY AREA AND
2A GRIFFEY ROAD STUDY AREA
WEST SPRINGFIELD, PA 16443

TARGET PROPERTY COORDINATES

Latitude (North):	41.915099 - 41ˆ 54’ 54.36’’
Longitude (West):	80.484304 - 80ˆ 29’ 3.49’’
Universal Tranverse Mercator:	Zone 17
UTM X (Meters):	542766.7
UTM Y (Meters):	4640265.0
Elevation:	818 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	14042455 EAST SPRINGFIELD, PA
Version Date:	2019
West Map:	14438533 CONNEAUT, OH
Version Date:	2019

EDR’s GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

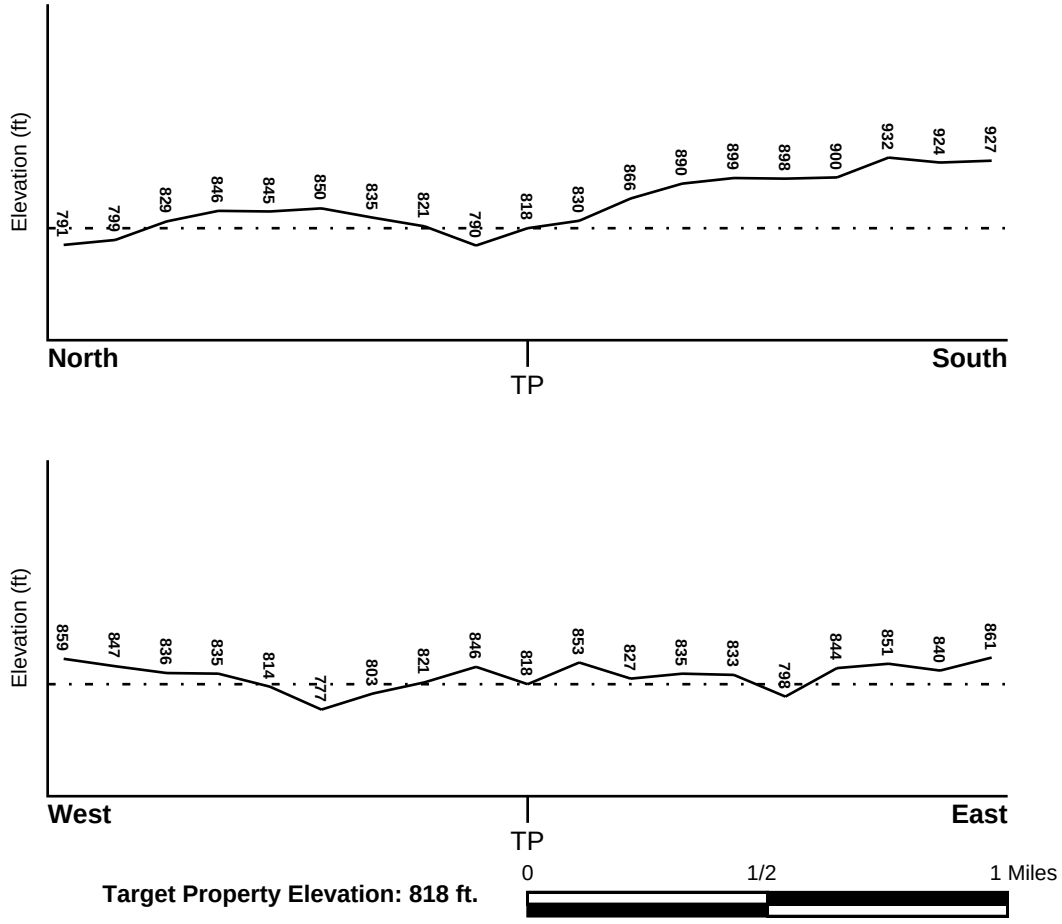
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General NNW

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Flood Plain Panel at Target Property	FEMA Source Type
42049C0315D	FEMA FIRM Flood data

Additional Panels in search area:	FEMA Source Type
42049C0295D	FEMA FIRM Flood data

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
EAST SPRINGFIELD	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

Era:	Paleozoic
System:	Devonian
Series:	Upper Devonian
Code:	D3 *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Stratified Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps. The following information is based on Soil Conservation Service STATSGO data.

Soil Component Name:	SHEFFIELD
Soil Surface Texture:	silt loam
Hydrologic Group:	Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.
Soil Drainage Class:	Poorly. Soils may have a saturated zone, a layer of low hydraulic conductivity, or seepage. Depth to water table is less than 1 foot.

Hydric Status: Soil meets the requirements for a hydric soil.

Corrosion Potential - Uncoated Steel:	HIGH
Depth to Bedrock Min:	> 60 inches
Depth to Bedrock Max:	> 60 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification			
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil	Permeability Rate (in/hr)	Soil Reaction (pH)
1	0 inches	8 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 2.00 Min: 0.60	Max: 5.50 Min: 4.50
2	8 inches	22 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.60 Min: 0.20	Max: 6.00 Min: 5.10
3	22 inches	41 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.06 Min: 0.00	Max: 7.30 Min: 5.60
4	41 inches	60 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.60 Min: 0.20	Max: 8.40 Min: 6.60

OTHER SOIL TYPES IN AREA

Based on Soil Conservation Service STATSGO data, the following additional subordinant soil types may appear within the general area of target property.

Soil Surface Textures: No Other Soil Types

Surficial Soil Types: No Other Soil Types

Shallow Soil Types: silty clay loam

Deeper Soil Types: stratified

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
B5	USGS40001039374	1/2 - 1 Mile East

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	PASI60000098205	1/4 - 1/2 Mile NNW
A2	PASI60000421002	1/2 - 1 Mile ESE
A3	PASI60000420449	1/2 - 1 Mile ESE
B4	PASI60000019044	1/2 - 1 Mile East
6	PASI60000096922	1/2 - 1 Mile SE
7	PASI60000098224	1/2 - 1 Mile ENE

OTHER STATE DATABASE INFORMATION

STATE OIL/GAS WELL INFORMATION

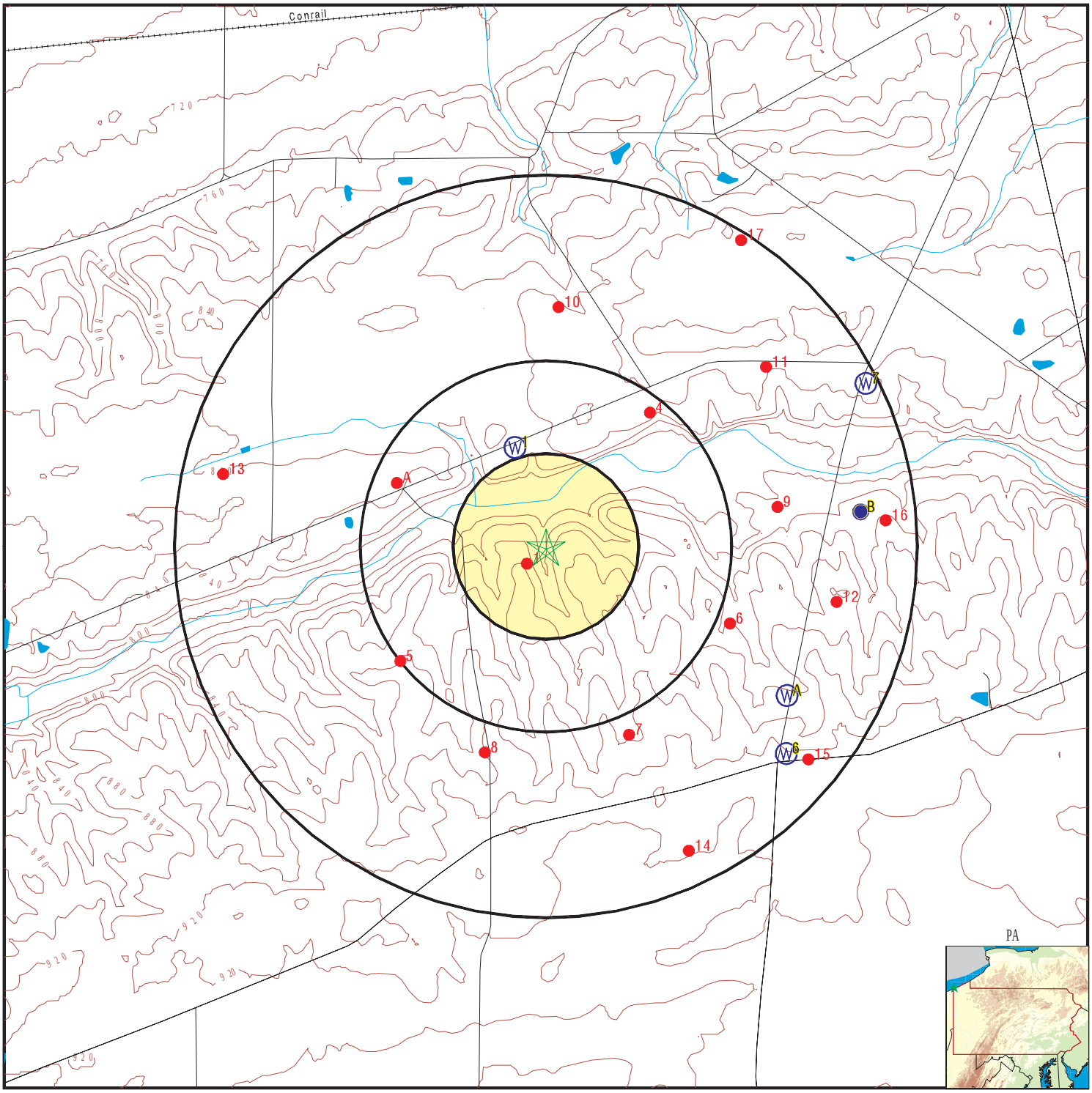
MAP ID	WELL ID	LOCATION FROM TP
1	PAOG80000075162	0 - 1/8 Mile SW
A2	PAOG80000005005	1/4 - 1/2 Mile WNW
A3	PAOG80000159065	1/4 - 1/2 Mile WNW
4	PAOG80000077262	1/4 - 1/2 Mile NE
5	PAOG80000135216	1/4 - 1/2 Mile SW
6	PAOG80000095804	1/2 - 1 Mile ESE
7	PAOG80000004820	1/2 - 1 Mile SSE
8	PAOG80000015944	1/2 - 1 Mile SSW
9	PAOG80000061899	1/2 - 1 Mile East
10	PAOG80000024070	1/2 - 1 Mile North
11	PAOG80000117580	1/2 - 1 Mile NE
12	PAOG80000028906	1/2 - 1 Mile East
13	PAOG80000095416	1/2 - 1 Mile WNW
14	PAOG80000042250	1/2 - 1 Mile SSE

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
15	PAOG80000064165	1/2 - 1 Mile SE
16	PAOG80000053018	1/2 - 1 Mile East
17	PAOG80000078498	1/2 - 1 Mile NNE

PHYSICAL SETTING SOURCE MAP - 7079489.2s



- County Boundary
- Major Roads
- Contour Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons
- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location
- Oil, gas or related wells

SITE NAME:	IB Brown Road Study Area and	CLIENT:	U.S. Army Corps of Engineers
ADDRESS:	2A Griffey Road Study Area West Springfield PA 16443	CONTACT:	Martin Jander
LAT/LONG:	41.915099 / 80.484304	INQUIRY #:	7079489.2s
		DATE:	August 10, 2022 4:51 pm

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

1
NNW
1/4 - 1/2 Mile
Higher

PA WELLS **PASI60000098205**

Database:	Pennsylvania Groundwater Information System		
GWIS ID:	98309	Local Well #:	1784N
Aquifer:	CHADAKOIN FORMATION	Topography:	Hillside
Well Depth:	80	Elevation:	0
Site Type:	W	Depth to Bedrock:	29
Saltwater Zone:	0	Date Drilled:	01-MAY-80
Local Permit #:	Not Reported		
Owner ID:	97605	Ownership Date:	Not Reported
Construction Date:	01-MAY-80	Driller:	1094
Source of Construction Data:	DRILLERS RECORD	Construction Method:	Not Reported
How Finished:	Unsuppored (Uncased) Borehole		
Driller Well ID:	Not Reported	Reason Abandoned:	Not Reported
Construction Type:	New Well	Original Driller Name:	Not Reported
Discharge Type:	Unknown	Data Source:	DRILLERS RECORD
Discharge Measurement Method:	Bailer	Discharge:	1.
Static Water Level (ft):	24.	Agency Providing Data:	Drillers Record
WL Measurement Method:	REPORTED, METHOD NOT KNOWN		
Production Water Level (ft):	70.	Drawdown (ft):	46.
Yield (gmp/ft):	Not Reported	Test Length (min):	4.
SiteStatus at Test:	Not Reported	Date Discharged:	01-MAY-80
Lithology:	UNKNOWN	Contributing Unit:	Primary
Top of Interval:	Not Reported	Bottom of Interval:	Not Reported
Site Use:	WITHDRAWAL	Date of Use:	Not Reported
Water Use:	DOMESTIC	Notes:	Not Reported

A2
ESE
1/2 - 1 Mile
Higher

PA WELLS **PASI60000421002**

Database:	Pennsylvania Groundwater Information System		
GWIS ID:	0	Local Well #:	Not Reported
Aquifer:	Not Reported	Topography:	Not Reported
Well Depth:	80	Elevation:	0
Site Type:	W	Depth to Bedrock:	55
Saltwater Zone:	0	Date Drilled:	30-MAY-14
Local Permit #:	Not Reported		
Owner ID:	7484304	Ownership Date:	Not Reported

Discharge Type:	Not Reported	Data Source:	Not Reported
Discharge Measurement Method:	Voumetric, Watch and Bucket		
Discharge:	1.	Static Water Level (ft):	16.
Agency Providing Data:	Not Reported	WL Measurement Method:	Not Reported
Production Water Level (ft):	80.	Drawdown (ft):	Not Reported
Yield (gmp/ft):	Not Reported	Test Length (min):	60.
SiteStatus at Test:	Not Reported	Date Discharged:	Not Reported
Site Use:	WITHDRAWAL	Date of Use:	Not Reported
Water Use:	DOMESTIC	Notes:	Not Reported

A3
ESE
1/2 - 1 Mile
Higher

PA WELLS **PASI60000420449**

Database:	Pennsylvania Groundwater Information System		
GWIS ID:	0	Local Well #:	Not Reported
Aquifer:	Not Reported	Topography:	Not Reported
Well Depth:	80	Elevation:	0
Site Type:	W	Depth to Bedrock:	54
Saltwater Zone:	0	Date Drilled:	14-MAY-14
Local Permit #:	Not Reported		
Owner ID:	7483822	Ownership Date:	Not Reported
Discharge Type:	Not Reported	Data Source:	Not Reported
Discharge Measurement Method:	Bailer	Discharge:	0.
Static Water Level (ft):	22.	Agency Providing Data:	Not Reported
WL Measurement Method:	Not Reported	Production Water Level (ft):	80.
Drawdown (ft):	Not Reported	Yield (gmp/ft):	Not Reported
Test Length (min):	30.	SiteStatus at Test:	Not Reported
Date Discharged:	Not Reported		
Site Use:	WITHDRAWAL	Date of Use:	Not Reported
Water Use:	DOMESTIC	Notes:	Not Reported

Comments: Well Is Low Yield. Will Fill To Static Level Overnight.

B4
East
1/2 - 1 Mile
Higher

PA WELLS **PASI60000019044**

Database:	Pennsylvania Groundwater Information System		
GWIS ID:	19046	Local Well #:	ER 1244
Aquifer:	GLACIAL OUTWASH	Topography:	Hillside
Well Depth:	48	Elevation:	825
Site Type:	W	Depth to Bedrock:	0
Saltwater Zone:	0	Date Drilled:	24-AUG-56
Local Permit #:	Not Reported		

Owner ID:	18989	Ownership Date:	24-AUG-56
Construction Date:	24-AUG-56	Driller:	0410
Source of Construction Data:	DRILLERS RECORD	Construction Method:	Cable Tool
How Finished:	Entire Length Cased, Open End		
Driller Well ID:	Not Reported	Reason Abandoned:	Not Reported
Construction Type:	Not Reported	Original Driller Name:	Not Reported
Discharge Type:	Pumped	Data Source:	DRILLERS RECORD
Discharge Measurement Method:	Bailer	Discharge:	10.
Static Water Level (ft):	25.	Agency Providing Data:	Drillers Record
WL Measurement Method:	STEEL TAPE	Production Water Level (ft):	Not Reported
Drawdown (ft):	Not Reported	Yield (gmp/ft):	Not Reported
Test Length (min):	Not Reported	SiteStatus at Test:	Not Reported
Date Discharged:	24-AUG-56		
Lithology:	GRAVEL	Contributing Unit:	Primary
Top of Interval:	Not Reported	Bottom of Interval:	Not Reported
Site Use:	WITHDRAWAL	Date of Use:	Not Reported
Water Use:	DOMESTIC	Notes:	Not Reported
Agency Site Use:	Inventory Data Site Only	Agency Use Date:	Not Reported

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B5
East
1/2 - 1 Mile
Higher

FED USGS **USGS40001039374**

Organization ID:	USGS-PA		
Organization Name:	USGS Pennsylvania Water Science Center		
Monitor Location:	ER 1244	Type:	Well
Description:	Not Reported	HUC:	04120101
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Sand and gravel aquifers (glaciated regions)		
Formation Type:	Outwash	Aquifer Type:	Not Reported
Construction Date:	19560824	Well Depth:	48
Well Depth Units:	ft	Well Hole Depth:	48
Well Hole Depth Units:	ft		
Ground water levels,Number of Measurements:	1	Level reading date:	1956-08-24
Feet below surface:	25	Feet to sea level:	Not Reported
Note:	Not Reported		

6
SE
1/2 - 1 Mile
Higher

PA WELLS **PASI60000096922**

Database:	Pennsylvania Groundwater Information System		
GWIS ID:	97025	Local Well #:	1331N

Aquifer:	CHADAKOIN FORMATION	Topography:	Hillside
Well Depth:	85	Elevation:	0
Site Type:	W	Depth to Bedrock:	7
Saltwater Zone:	0	Date Drilled:	01-JUL-84
Local Permit #:	Not Reported		
Owner ID:	96323	Ownership Date:	Not Reported
Construction Date:	01-JUL-84	Driller:	1209
Source of Construction Data:	DRILLERS RECORD	Construction Method:	Not Reported
How Finished:	Entire Length Cased, Some Sections Perforated/Slotted		
Driller Well ID:	Not Reported	Reason Abandoned:	Not Reported
Construction Type:	New Well	Original Driller Name:	Not Reported
Discharge Type:	Unknown	Data Source:	DRILLERS RECORD
Discharge Measurement Method:	Voumetric, Watch and Bucket		
Discharge:	20.	Static Water Level (ft):	50.
Agency Providing Data:	Drillers Record	WL Measurement Method:	REPORTED, METHOD NOT KNOWN
Production Water Level (ft):	60.	Drawdown (ft):	10.
Yield (gmp/ft):	Not Reported	Test Length (min):	10.
SiteStatus at Test:	Not Reported	Date Discharged:	01-JUL-84
Lithology:	UNKNOWN	Contributing Unit:	Primary
Top of Interval:	Not Reported	Bottom of Interval:	Not Reported
Site Use:	WITHDRAWAL	Date of Use:	Not Reported
Water Use:	DOMESTIC	Notes:	Not Reported

7
ENE
1/2 - 1 Mile
Higher

PA WELLS **PASI60000098224**

Database:	Pennsylvania Groundwater Information System		
GWIS ID:	98328	Local Well #:	X 1259
Aquifer:	CONNEAUT FORMATION	Topography:	Not Reported
Well Depth:	93	Elevation:	0
Site Type:	W	Depth to Bedrock:	0
Saltwater Zone:	0	Date Drilled:	Not Reported
Local Permit #:	Not Reported		
Owner ID:	97623	Ownership Date:	Not Reported
Construction Date:	Not Reported	Driller:	1197
Source of Construction Data:	DRILLERS RECORD	Construction Method:	Not Reported
How Finished:	Unsuppored (Uncased) Borehole		
Driller Well ID:	Not Reported	Reason Abandoned:	Not Reported
Construction Type:	New Well	Original Driller Name:	Not Reported
Discharge Type:	Unknown	Data Source:	DRILLERS RECORD
Discharge Measurement Method:	Unknown	Discharge:	22.

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Static Water Level (ft):	53.	Agency Providing Data:	Drillers Record
WL Measurement Method:	REPORTED, METHOD NOT KNOWN		
Production Water Level (ft):	Not Reported	Drawdown (ft):	Not Reported
Yield (gmp/ft):	Not Reported	Test Length (min):	30.
SiteStatus at Test:	Not Reported	Date Discharged:	Not Reported
Lithology:	Not Reported	Contributing Unit:	Primary
Top of Interval:	Not Reported	Bottom of Interval:	Not Reported
Site Use:	WITHDRAWAL	Date of Use:	Not Reported
Water Use:	DOMESTIC	Notes:	Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance

Database EDR ID Number

1
SW
0 - 1/8 Mile

OIL_GAS **PAOG80000075162**

Organization:	GREENRIDGE OIL CO LLC	Client ID:	284218
Client:	GREENRIDGE OIL CO LLC	Site ID:	547442
Site Name:	HAHN 1 OG WELL	Primary Facility ID:	565504
Primary Facility:	HAHN 1	Sub Facility ID:	555965
Sub Facility:	HAHN 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

A2
WNW
1/4 - 1/2 Mile

OIL_GAS **PAOG80000005005**

Organization:	MIDTERRA ASSOC INC	Client ID:	45359
Client:	MIDTERRA ASSOC INC	Site ID:	35919
Site Name:	RA KING 1 OG WELL	Primary Facility ID:	37671
Primary Facility:	RA KING 1	Sub Facility ID:	1054585
Sub Facility:	RA KING 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

A3
WNW
1/4 - 1/2 Mile

OIL_GAS **PAOG80000159065**

Organization:	MIDTERRA ASSOC INC	Client ID:	45359
Client:	MIDTERRA ASSOC INC	Site ID:	35919
Site Name:	RA KING 1 OG WELL	Primary Facility ID:	37671
Primary Facility:	RA KING 1	Sub Facility ID:	51201
Sub Facility:	RA KING 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

4
NE
1/4 - 1/2 Mile

OIL_GAS **PAOG80000077262**

Organization:	GREENRIDGE OIL CO LLC	Client ID:	284218
Client:	GREENRIDGE OIL CO LLC	Site ID:	35855
Site Name:	WELDON 1OG WELL	Primary Facility ID:	37607
Primary Facility:	WELDON 1	Sub Facility ID:	51137
Sub Facility:	WELDON 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance

Database EDR ID Number

5
SW
1/4 - 1/2 Mile

OIL_GAS **PAOG80000135216**

Organization:	GREENRIDGE OIL CO LLC	Client ID:	284218
Client:	GREENRIDGE OIL CO LLC	Site ID:	35789
Site Name:	ROBERT L & IJ BLOOD 1 OG WELL	Primary Facility ID:	37541
Primary Facility:	ROBERT L & IJ BLOOD 1	Sub Facility ID:	51071
Sub Facility:	ROBERT L & IJ BLOOD 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

6
ESE
1/2 - 1 Mile

OIL_GAS **PAOG80000095804**

Organization:	Unavailable	Client ID:	47941
Client:	REX DRUMMOND	Site ID:	36017
Site Name:	PHILLIP PATTEN 1 OG WELL	Primary Facility ID:	37769
Primary Facility:	PHILLIP PATTEN 1	Sub Facility ID:	51299
Sub Facility:	PHILLIP PATTEN 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	NO

7
SSE
1/2 - 1 Mile

OIL_GAS **PAOG80000004820**

Organization:	GREENRIDGE OIL CO LLC	Client ID:	284218
Client:	GREENRIDGE OIL CO LLC	Site ID:	35848
Site Name:	JL WHITE MAVROS 1 OG WELL	Primary Facility ID:	37600
Primary Facility:	JL WHITE MAVROS 1	Sub Facility ID:	51130
Sub Facility:	JL WHITE MAVROS 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

8
SSW
1/2 - 1 Mile

OIL_GAS **PAOG80000015944**

Organization:	GREENRIDGE OIL CO LLC	Client ID:	284218
Client:	GREENRIDGE OIL CO LLC	Site ID:	35831
Site Name:	RL & RJ BLOOD RL BLOOD 2 OG WELL	Primary Facility ID:	37583
Primary Facility:	RL & RJ BLOOD RL BLOOD 2	Sub Facility ID:	51113
Sub Facility:	RL & RJ BLOOD RL BLOOD 2	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

Map ID
Direction
Distance

Database EDR ID Number

9
East
1/2 - 1 Mile

OIL_GAS **PAOG80000061899**

Organization:	Unavailable	Client ID:	47941
Client:	REX DRUMMOND	Site ID:	36031
Site Name:	J & A BLOOD 1 OG WELL	Primary Facility ID:	37783
Primary Facility:	J & A BLOOD 1	Sub Facility ID:	51313
Sub Facility:	J & A BLOOD 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

10
North
1/2 - 1 Mile

OIL_GAS **PAOG80000024070**

Organization:	MIDTERRA ASSOC INC	Client ID:	45359
Client:	MIDTERRA ASSOC INC	Site ID:	35901
Site Name:	WK HOPKINS 1 OG WELL	Primary Facility ID:	37653
Primary Facility:	WK HOPKINS 1	Sub Facility ID:	51183
Sub Facility:	WK HOPKINS 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Inactive	Compliance:	YES

11
NE
1/2 - 1 Mile

OIL_GAS **PAOG80000117580**

Organization:	GREENRIDGE OIL CO LLC	Client ID:	284218
Client:	GREENRIDGE OIL CO LLC	Site ID:	35905
Site Name:	HAROLD THAYER 1 OG WELL	Primary Facility ID:	37657
Primary Facility:	HAROLD THAYER 1	Sub Facility ID:	51187
Sub Facility:	HAROLD THAYER 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

12
East
1/2 - 1 Mile

OIL_GAS **PAOG80000028906**

Organization:	Unavailable	Client ID:	47941
Client:	REX DRUMMOND	Site ID:	36019
Site Name:	J & M FREEMAN 1 OG WELL	Primary Facility ID:	37771
Primary Facility:	J & M FREEMAN 1	Sub Facility ID:	51301
Sub Facility:	J & M FREEMAN 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

Map ID
Direction
Distance

Database EDR ID Number

13
WNW
1/2 - 1 Mile

OIL_GAS **PAOG80000095416**

Organization:	SHELEX DRILLING INC	Client ID:	48671
Client:	SHELEX DRILLING INC	Site ID:	40305
Site Name:	J KONOPA JR 1 OG WELL	Primary Facility ID:	42057
Primary Facility:	J KONOPA JR 1	Sub Facility ID:	55587
Sub Facility:	J KONOPA JR 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

14
SSE
1/2 - 1 Mile

OIL_GAS **PAOG80000042250**

Organization:	GREENRIDGE OIL CO LLC	Client ID:	284218
Client:	GREENRIDGE OIL CO LLC	Site ID:	35829
Site Name:	B GRIFFEY 1 OG WELL	Primary Facility ID:	37581
Primary Facility:	B GRIFFEY 1	Sub Facility ID:	51111
Sub Facility:	B GRIFFEY 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

15
SE
1/2 - 1 Mile

OIL_GAS **PAOG80000064165**

Organization:	GREENRIDGE OIL CO LLC	Client ID:	284218
Client:	GREENRIDGE OIL CO LLC	Site ID:	35844
Site Name:	B GRIFFEY 2 OG WELL	Primary Facility ID:	37596
Primary Facility:	B GRIFFEY 2	Sub Facility ID:	51126
Sub Facility:	B GRIFFEY 2	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

16
East
1/2 - 1 Mile

OIL_GAS **PAOG80000053018**

Organization:	Unavailable	Client ID:	47941
Client:	REX DRUMMOND	Site ID:	36032
Site Name:	J & M FREEMAN 2 OG WELL	Primary Facility ID:	37784
Primary Facility:	J & M FREEMAN 2	Sub Facility ID:	51314
Sub Facility:	J & M FREEMAN 2	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	NO

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance

Database EDR ID Number

17
NNE
1/2 - 1 Mile

OIL_GAS **PAOG80000078498**

Organization:	GREENRIDGE OIL CO LLC	Client ID:	284218
Client:	GREENRIDGE OIL CO LLC	Site ID:	707286
Site Name:	PORTER 1 OG WELL	Primary Facility ID:	707609
Primary Facility:	PORTER 1	Sub Facility ID:	970987
Sub Facility:	PORTER 1	Type:	Oil & Gas Location
SubType:	NonCoal	Sub Facility Type:	Well
Site Status:	Active	Compliance:	YES

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: PA Radon

Radon Test Results

Zipcode	Num Tests	Min pCi/L	Max pCi/L	Avg pCi/L
16443	27	0.5	38.4	3.6

EPA Region 3 Statistical Summary Readings for Zip Code: 16443

Number of sites tested: 5.

Maximum Radon Level: 8.2 pCi/L.
Minimum Radon Level: 1.8 pCi/L.

pCi/L <4	pCi/L 4-10	pCi/L 10-20	pCi/L 20-50	pCi/L 50-100	pCi/L >100
2 (40.00%)	3 (60.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)

Federal EPA Radon Zone for ERIE County: 2

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory
Source: Pennsylvania Spatial Data Access
Telephone: 610-344-6105

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Pennsylvania Groundwater Information System
Source: Department of Conservation and Natural Resources
Telephone: 717-702-2045

OTHER STATE DATABASE INFORMATION

Pennsylvania Oil and Gas Locations
Source: Pennsylvania Department of Environmental Protection
Telephone: 814-863-0104
An Oil and Gas Location is a DEP primary facility type related to the Oil & Gas Program. The sub-facility types related to Oil and Gas that are included in this layer are:Land Application -- An area where drilling cuttings or waste are disposed by land application; Well-- A well associated with oil and/or gas production; Pit -- An approved pit that is used for storage of oil and gas well fluids. Some sub facility types are not included in this layer due to security policies.

RADON

State Database: PA Radon
Source: Department of Environmental Protection
Telephone: 717-783-3594
Radon Test Results Statistics by Zip Code

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

EPA Region 3 Statistical Summary Readings
Source: Region 3 EPA
Telephone: 215-814-2082
Radon readings for Delaware, D.C., Maryland, Pennsylvania, Virginia and West Virginia.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary faultlines, prepared in 1975 by the United State Geological Survey

STREET AND ADDRESS INFORMATION

IB Brown Road Study Area and

2A Griffey Road Study Area

West Springfield, PA 16443

Inquiry Number: 7079489.8

August 15, 2022

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

08/15/22

Site Name:

IB Brown Road Study Area and
2A Griffey Road Study Area
West Springfield, PA 16443
EDR Inquiry # 7079489.8

Client Name:

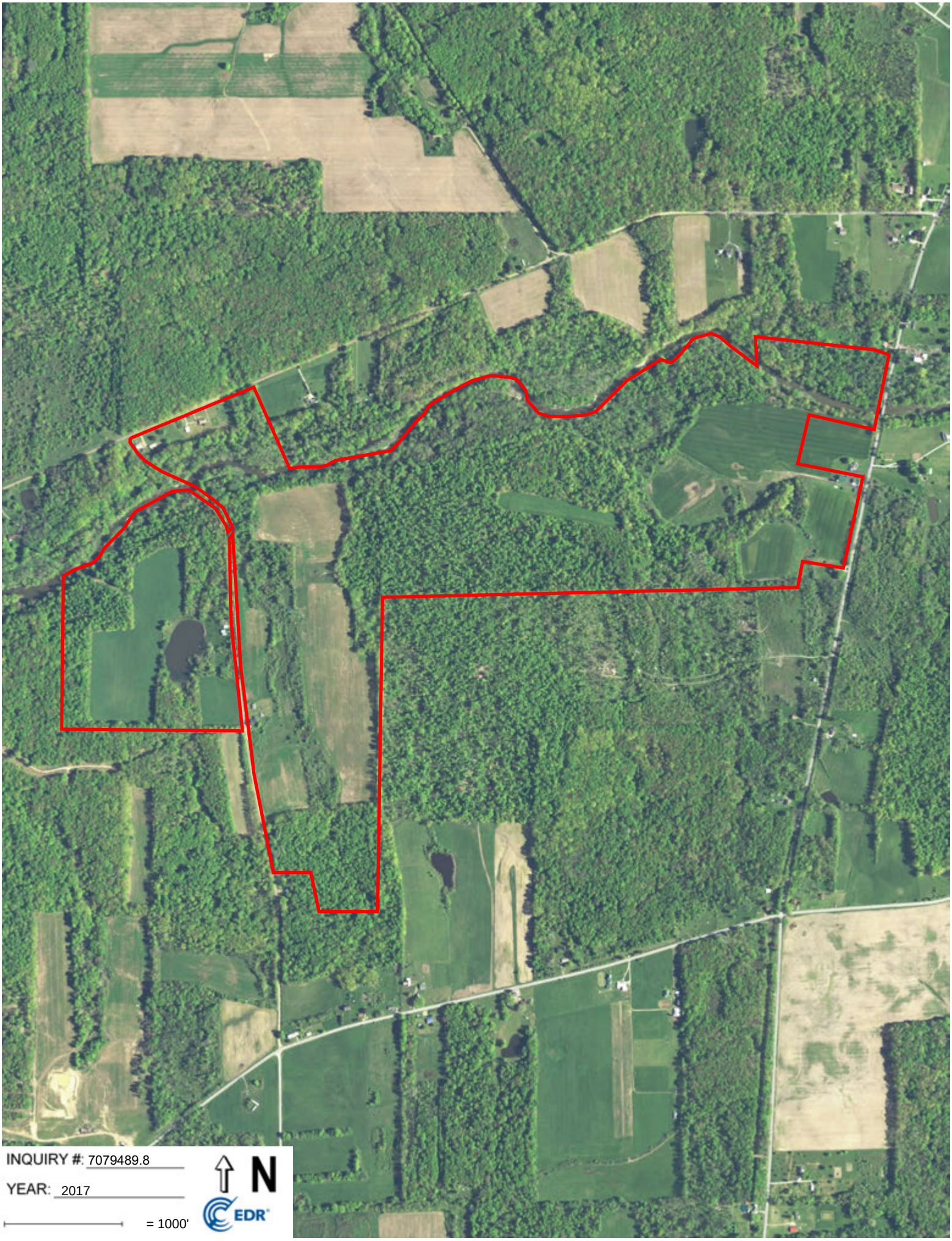
U.S. Army Corps of Engineers
1776 Niagra Street
Buffalo, NY 142073199
Contact: Martin Jander

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

Year	Scale	Details	Source
2017	1"=1000'	Flight Year: 2017	USDA/NAIP
2013	1"=1000'	Flight Year: 2013	USDA/NAIP
2010	1"=1000'	Flight Year: 2010	USDA/NAIP
2006	1"=1000'	Flight Year: 2006	USDA/NAIP
2002	1"=1000'	Flight Date: May 04, 2002	USGS
1993	1"=1000'	Acquisition Date: April 27, 1993	USGS/DOQQ
1983	1"=1000'	Flight Date: May 11, 1983	USDA
1977	1"=1000'	Flight Date: June 04, 1977	USGS
1968	1"=1000'	Flight Date: October 30, 1968	USDA
1960	1"=1000'	Flight Date: June 08, 1960	USGS
1959	1"=1000'	Flight Date: August 02, 1959	USDA
1956	1"=1000'	Flight Date: October 29, 1956	USGS
1938	1"=1000'	Flight Date: September 25, 1938	USDA

When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.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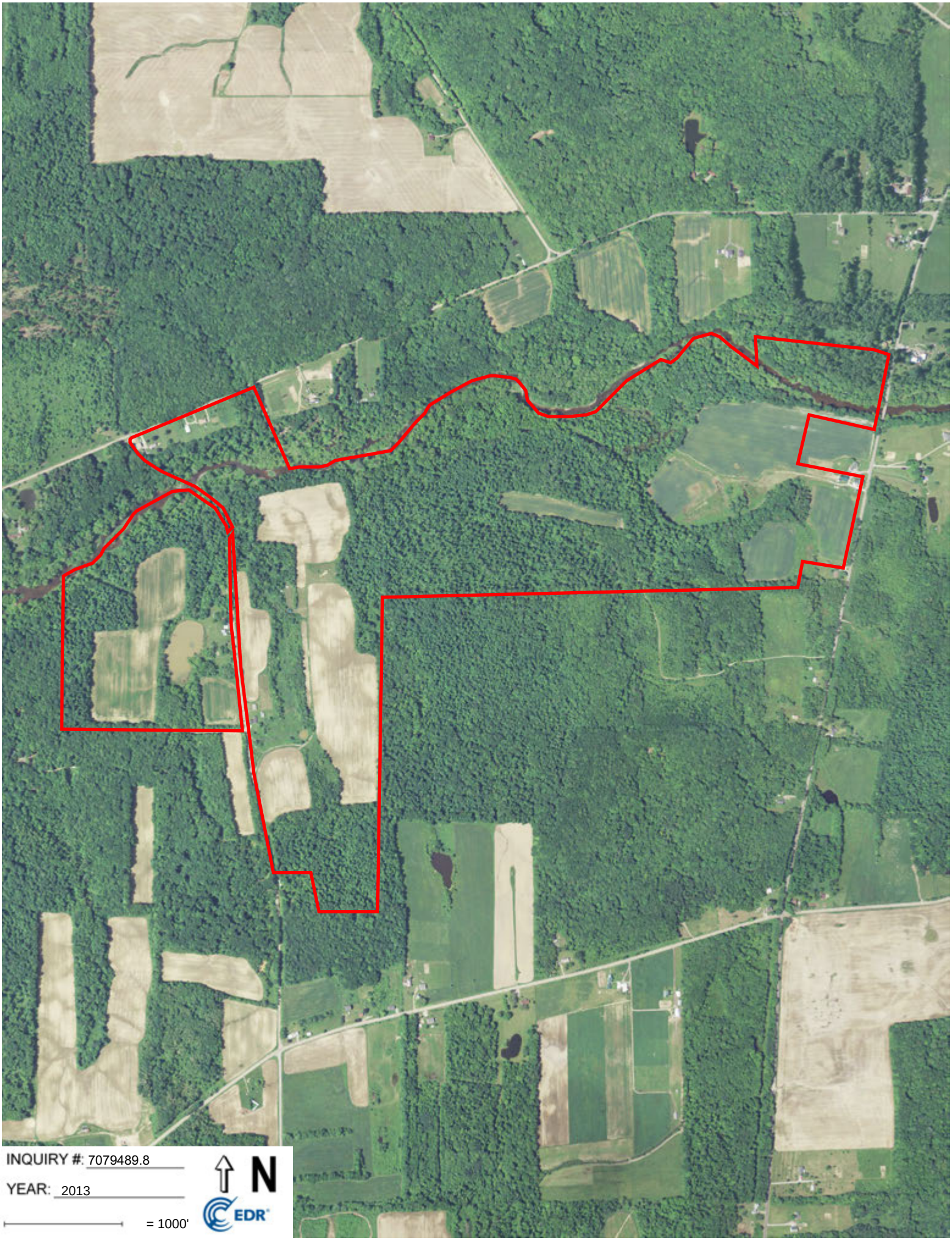
EDR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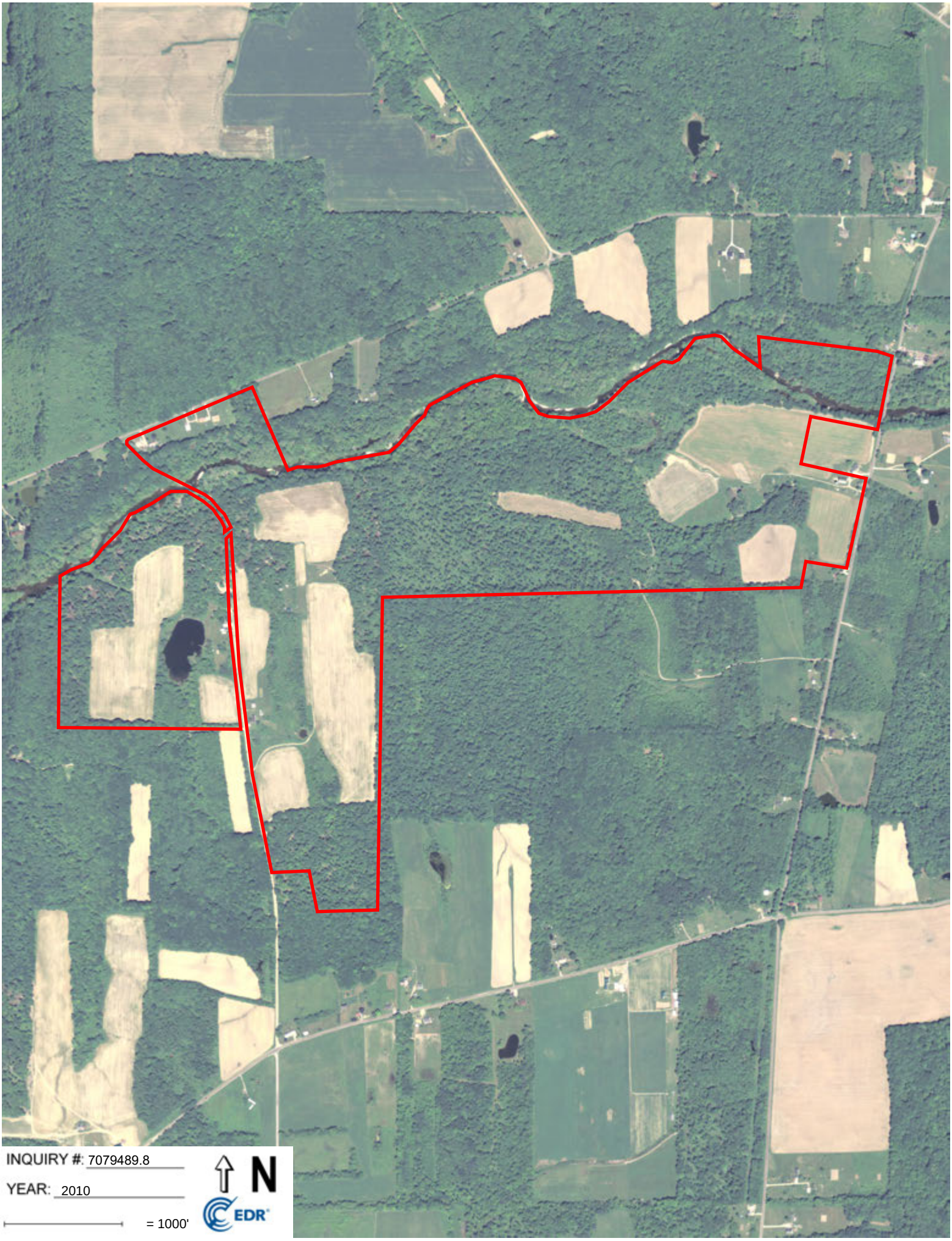
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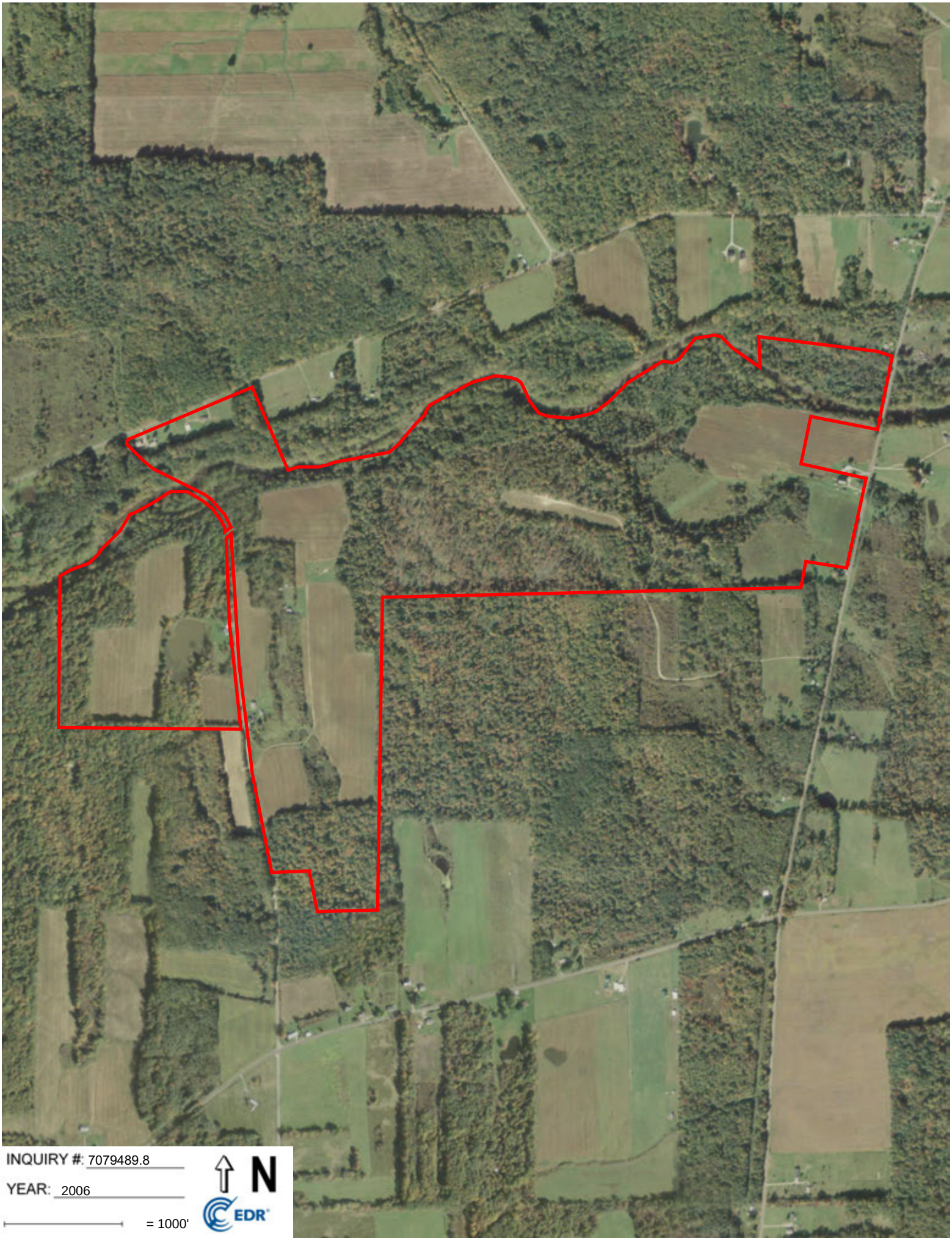
EDR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YEAR: 2006
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EDR

INQUIRY #: 7079489.8

YEAR: 2002

= 1000'

N

EDR

INQUIRY #: 7079489.8

YEAR: 1993

= 1000'

N

EDR

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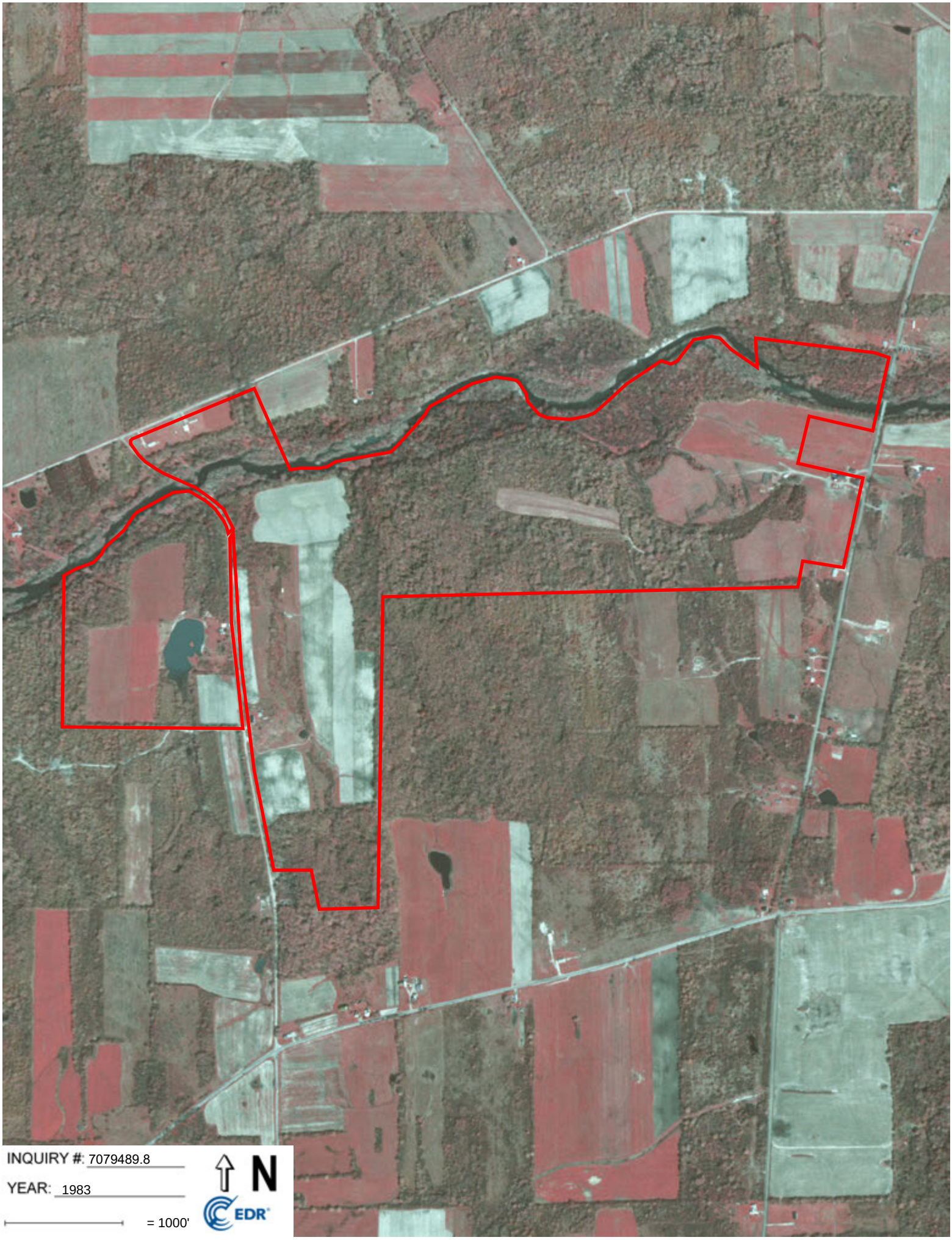
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EDR

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YEAR: 1977

= 1000'

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EDR

Subject boundary not shown because it exceeds image extent or image is not georeferenced.


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= 1000'
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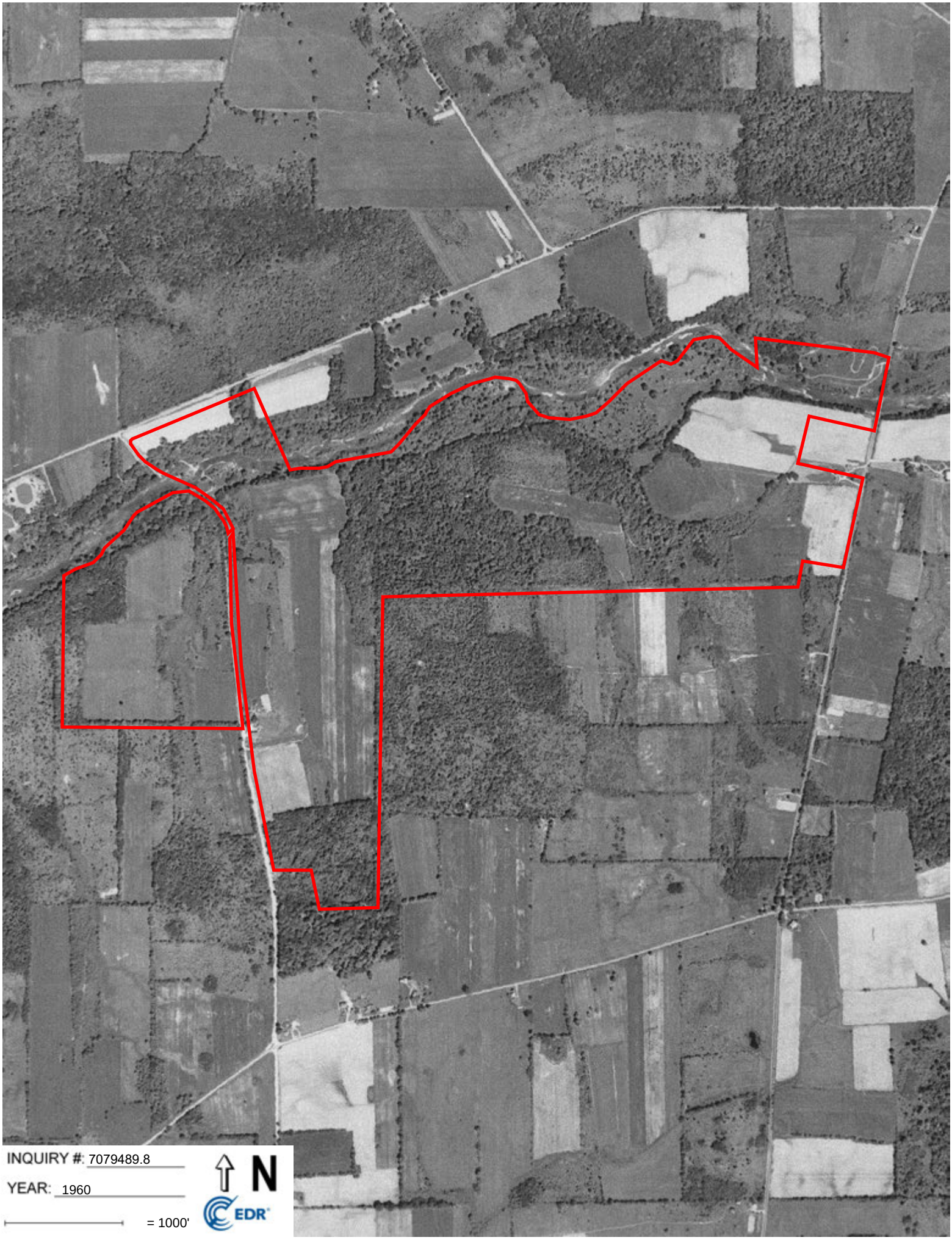
EDR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EDR


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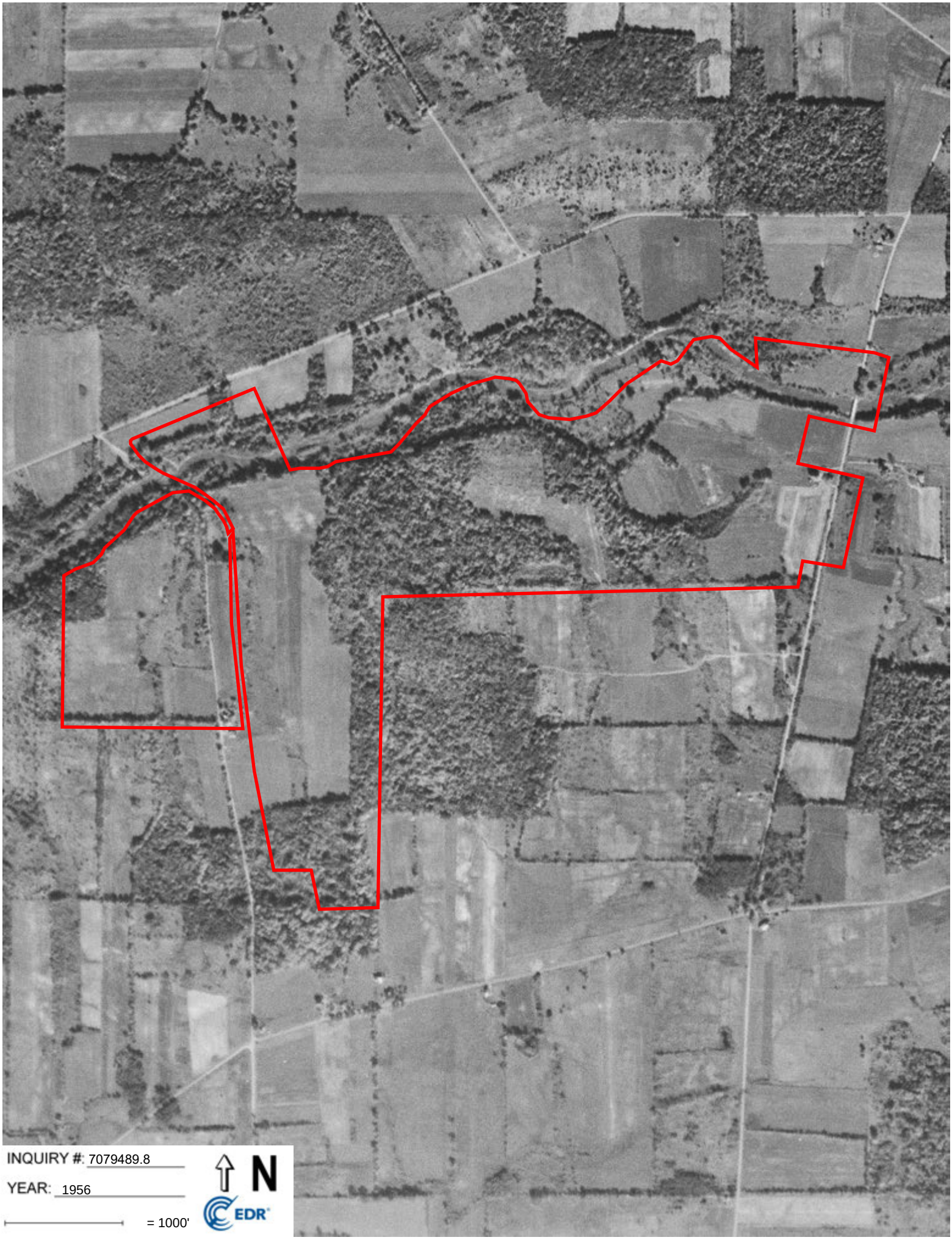
YEAR: 1959
= 1000'
N
EDR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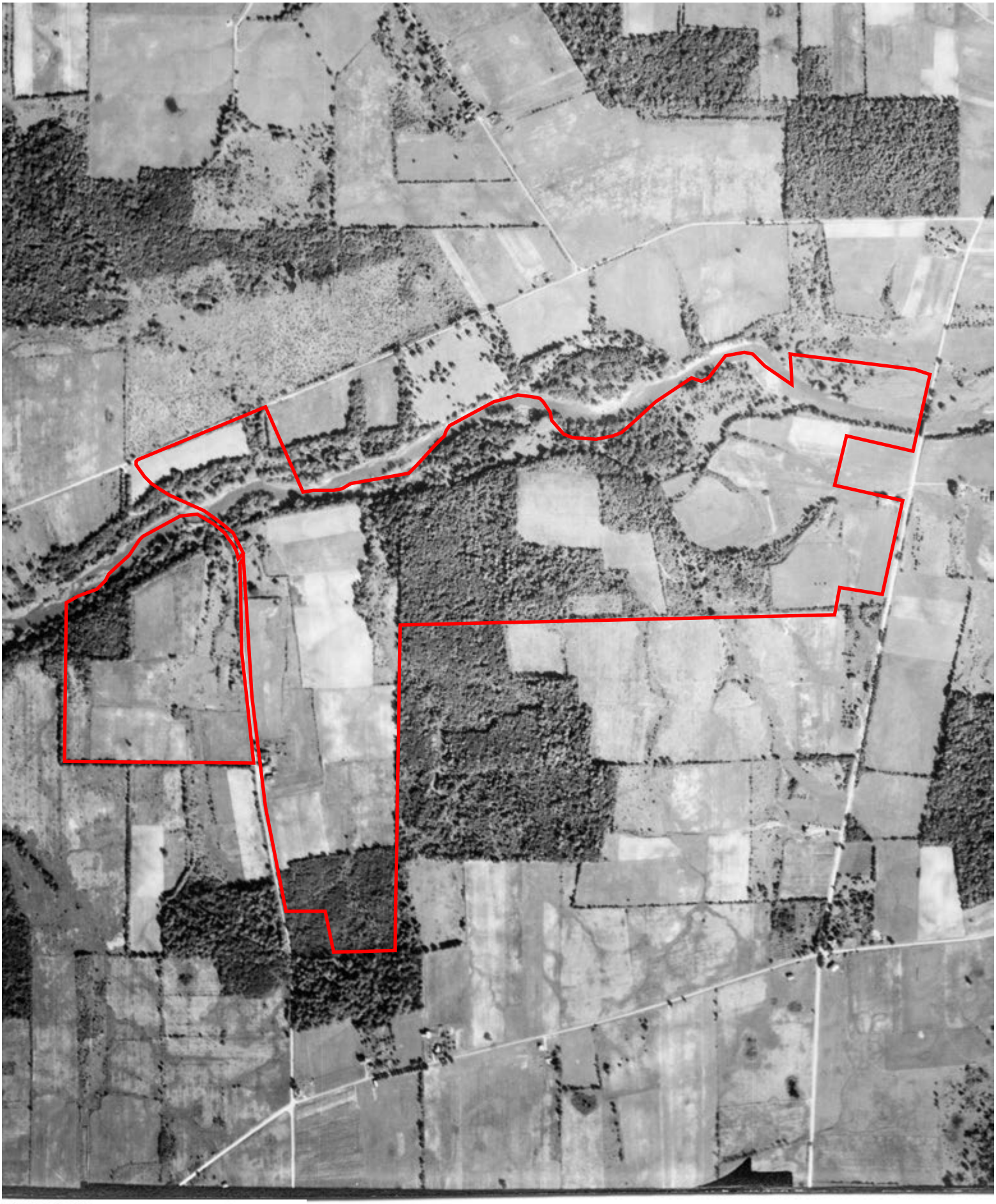


INQUIRY #: 7079489.8

YEAR: 1938

= 1000'

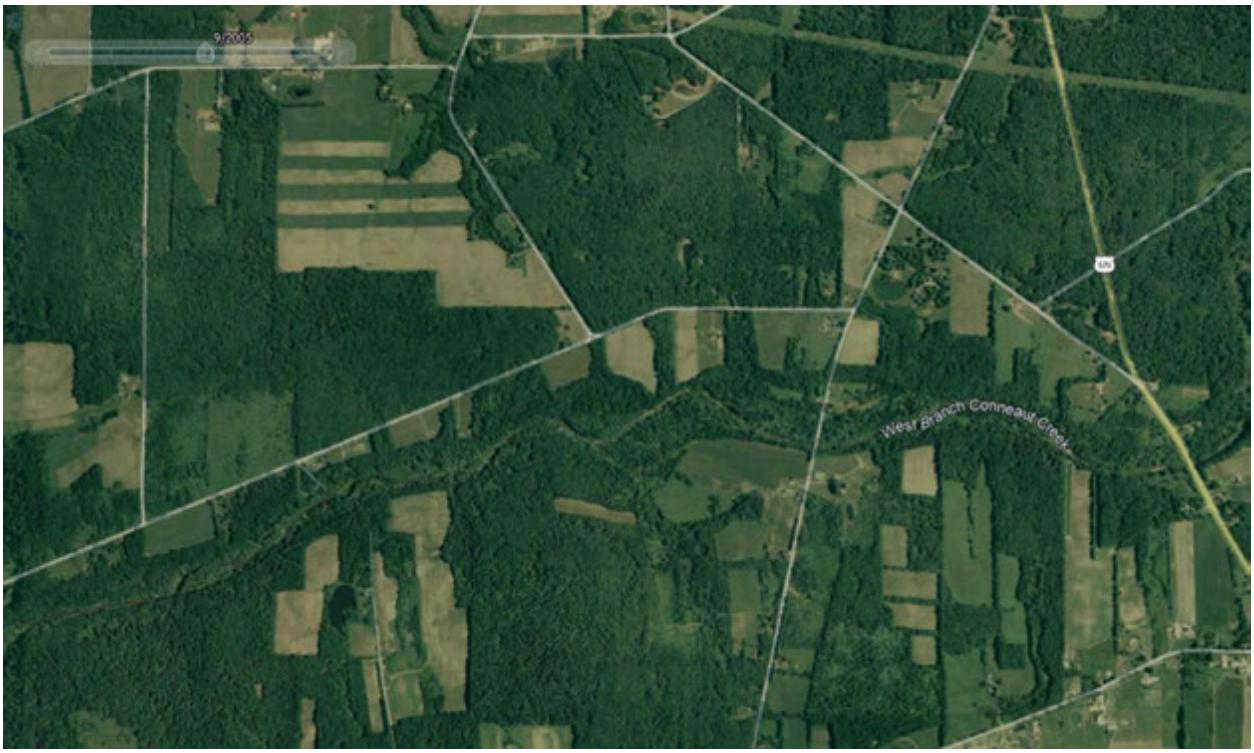
N

EDR

1985

1993

2004



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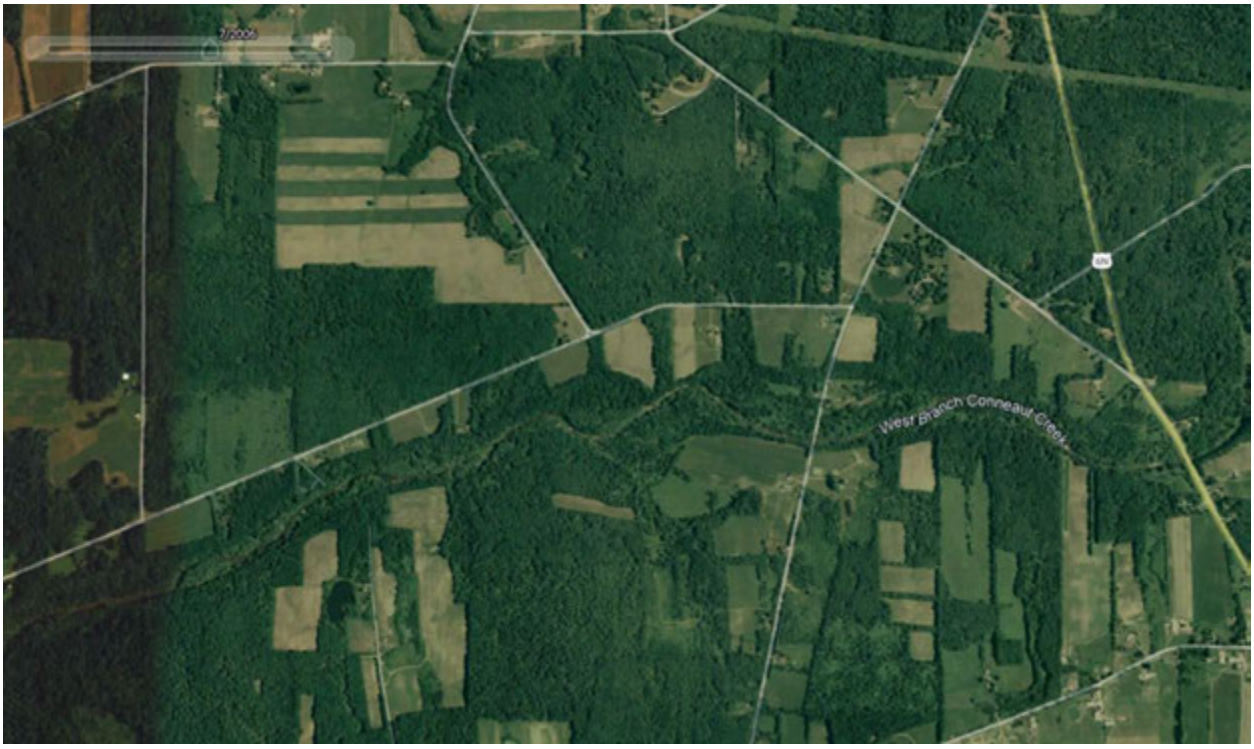

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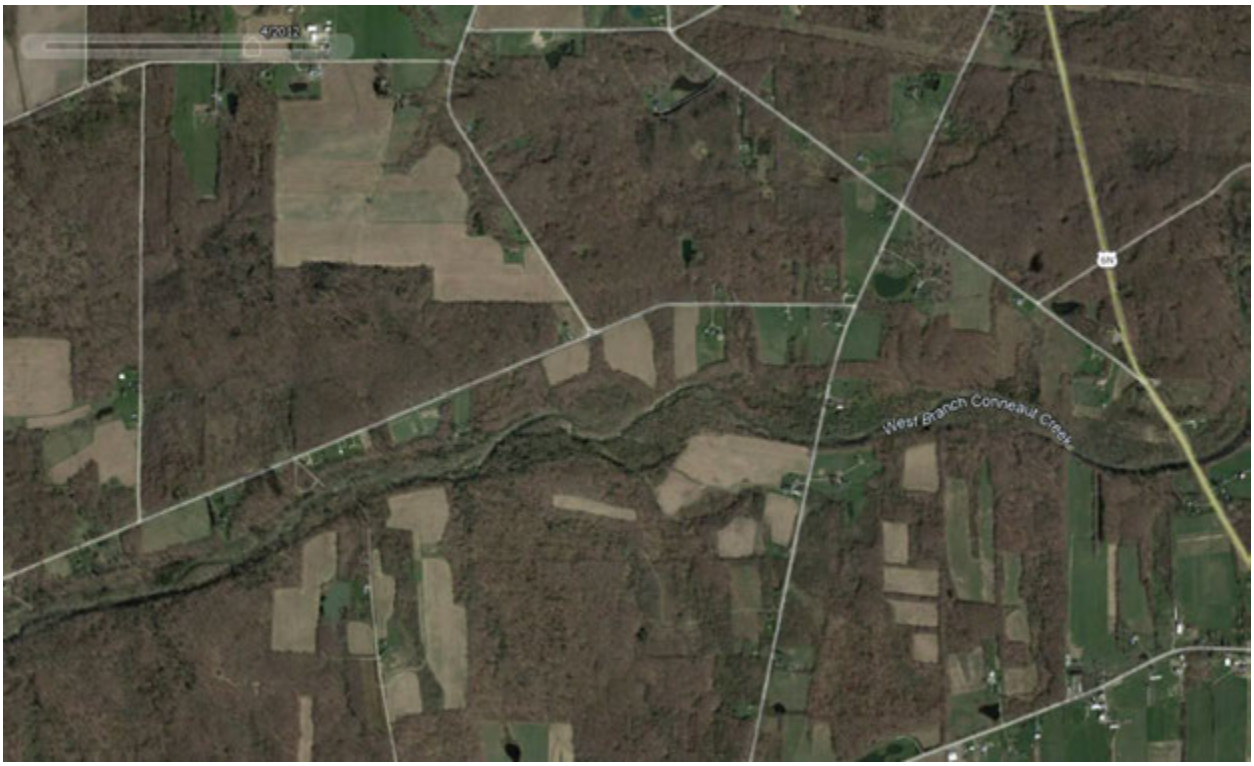
2008

2009

2010

2011



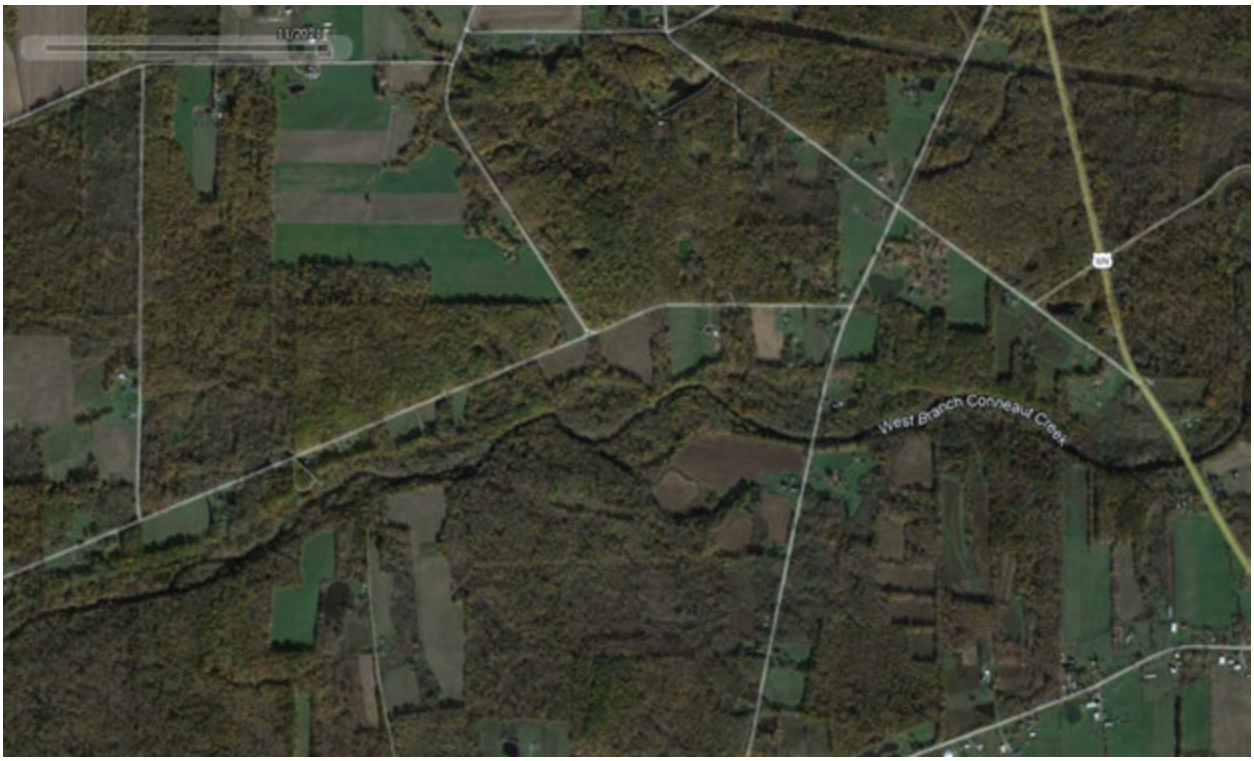
2012

2014

2015

2016

2019



2021

IB Brown Road Study Area and
2A Griffey Road Study Area
West Springfield, PA 16443

Inquiry Number: 7079489.3
August 10, 2022

Certified Sanborn® Map Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

08/10/22

Site Name:

IB Brown Road Study Area anc
2A Griffey Road Study Area
West Springfield, PA 16443
EDR Inquiry # 7079489.3

Client Name:

U.S. Army Corps of Engineers
1776 Niagra Street
Buffalo, NY 142073199
Contact: Martin Jander

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by U.S. Army Corps of Engineers were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Certification # 08C0-4178-BF8C

PO # NA

Project Conneaut Sea Lamprey Barrier

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

Sanborn® Library search results

Certification #: 08C0-4178-BF8C

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ✓ Library of Congress
- ✓ University Publications of America
- ✓ EDR Private Collection

The Sanborn Library LLC Since 1866™

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IB Brown Road Study Area and
2A Griffey Road Study Area
West Springfield, PA 16443

Inquiry Number: 7079489.4
August 10, 2022

EDR Historical Topo Map Report

with QuadMatch™

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topo Map Report

08/10/22

Site Name:	Client Name:
IB Brown Road Study Area and	U.S. Army Corps of Engineers
2A Griffey Road Study Area	1776 Niagra Street
West Springfield, PA 16443	Buffalo, NY 142073199
EDR Inquiry # 7079489.4	Contact: Martin Jander

EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by U.S. Army Corps of Engineers were identified for the years listed below. EDR's Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

Search Results:		*Coordinates:*	
P.O.#	NA	**Latitude:**	41.915099 41° 54' 54" North
Project:	Conneaut Sea Lamprey Barrier	**Longitude:**	-80.484304 -80° 29' 3" West
		UTM Zone:	Zone 17 North
		UTM X Meters:	542765.50
		UTM Y Meters:	4640478.40
		Elevation:	821.07' above sea level

Maps Provided:

2019
2016
2013
1990
1977
1969, 1970
1959, 1960
1900

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2019 Source Sheets

East Springfield
2019
7.5-minute, 24000

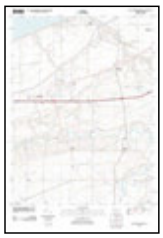
Conneaut
2019
7.5-minute, 24000

2016 Source Sheets

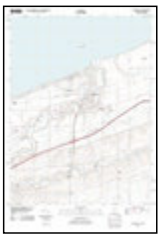
East Springfield
2016
7.5-minute, 24000

Conneaut
2016
7.5-minute, 24000

2013 Source Sheets



East Springfield
2013
7.5-minute, 24000



Conneaut
2013
7.5-minute, 24000

1990 Source Sheets

East Springfield
1990
7.5-minute, 24000
Aerial Photo Revised 1987

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1977 Source Sheets

East Springfield
1977
7.5-minute, 24000
Aerial Photo Revised 1969

1969, 1970 Source Sheets

East Springfield
1969
7.5-minute, 24000
Aerial Photo Revised 1969

Conneaut
1970
7.5-minute, 24000
Aerial Photo Revised 1970

1959, 1960 Source Sheets

East Springfield
1959
7.5-minute, 24000
Aerial Photo Revised 1957

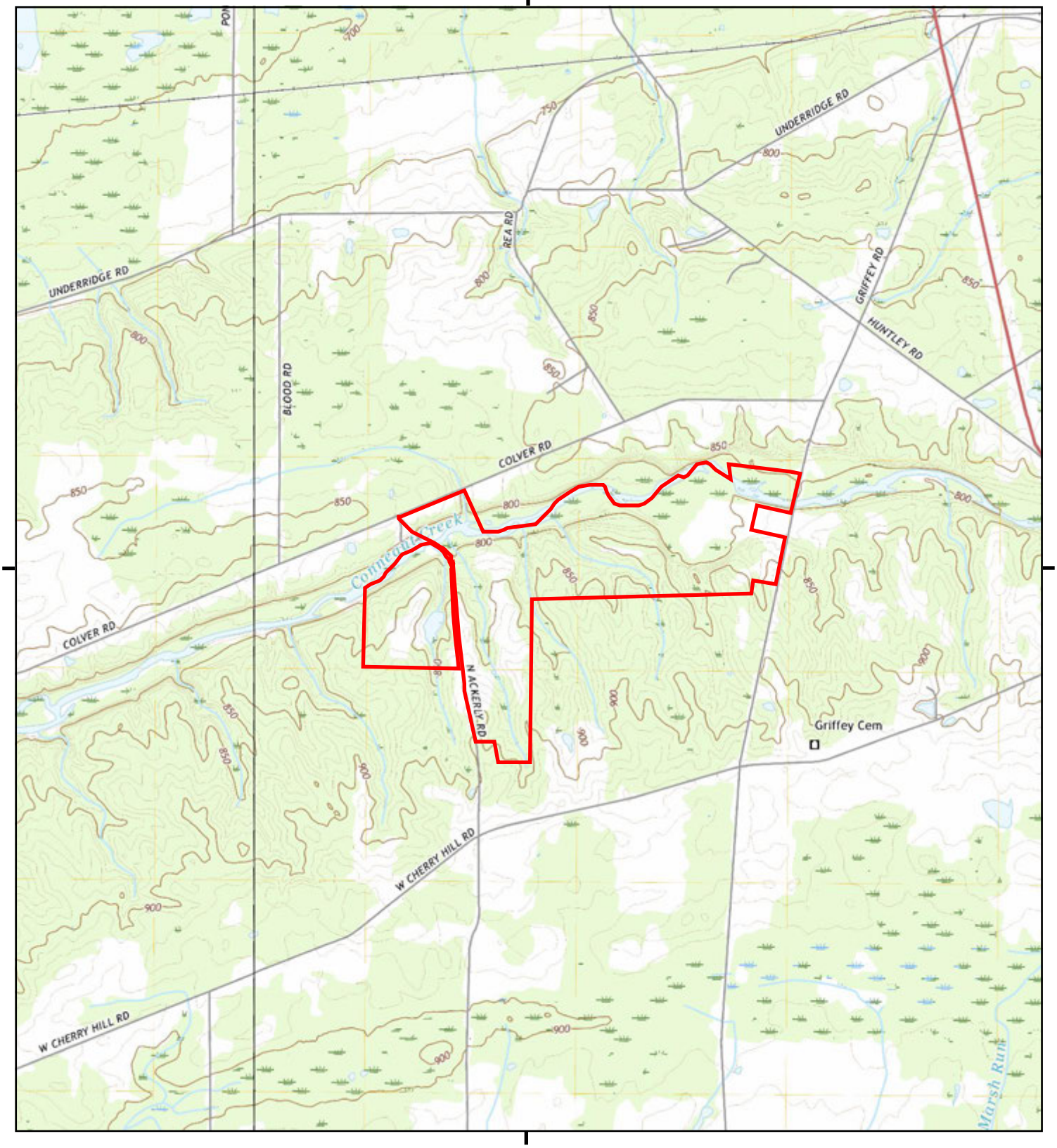
Conneaut
1960
7.5-minute, 24000
Aerial Photo Revised 1958

1900 Source Sheets

Girard
1900
15-minute, 62500

Historical Topo Map

2019



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

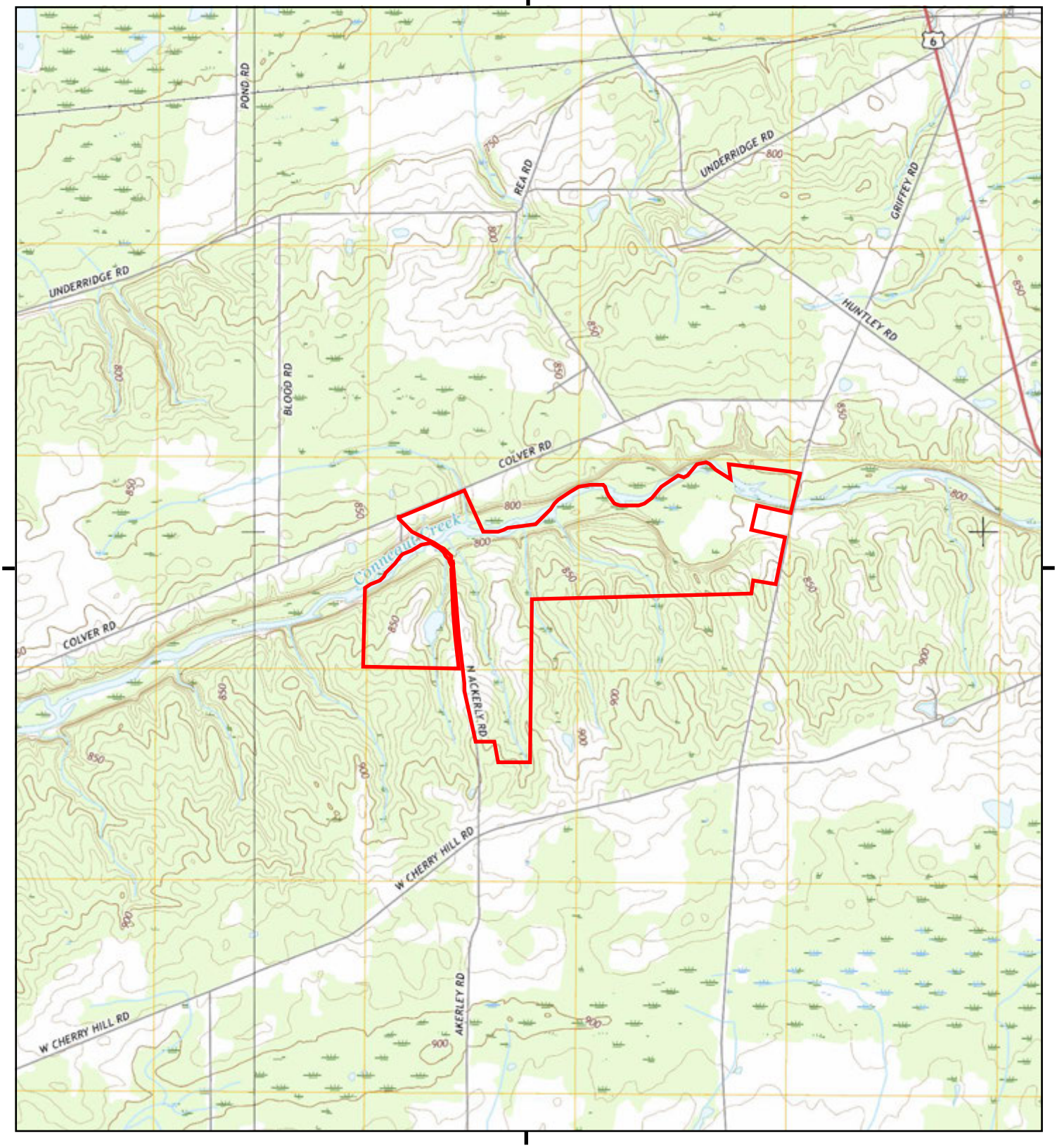
TP, East Springfield, 2019, 7.5-minute
W, Conneaut, 2019, 7.5-minute

SITE NAME: IB Brown Road Study Area and
ADDRESS: 2A Griffey Road Study Area
West Springfield, PA 16443
CLIENT: U.S. Army Corps of Engineers

N

Historical Topo Map

2016



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

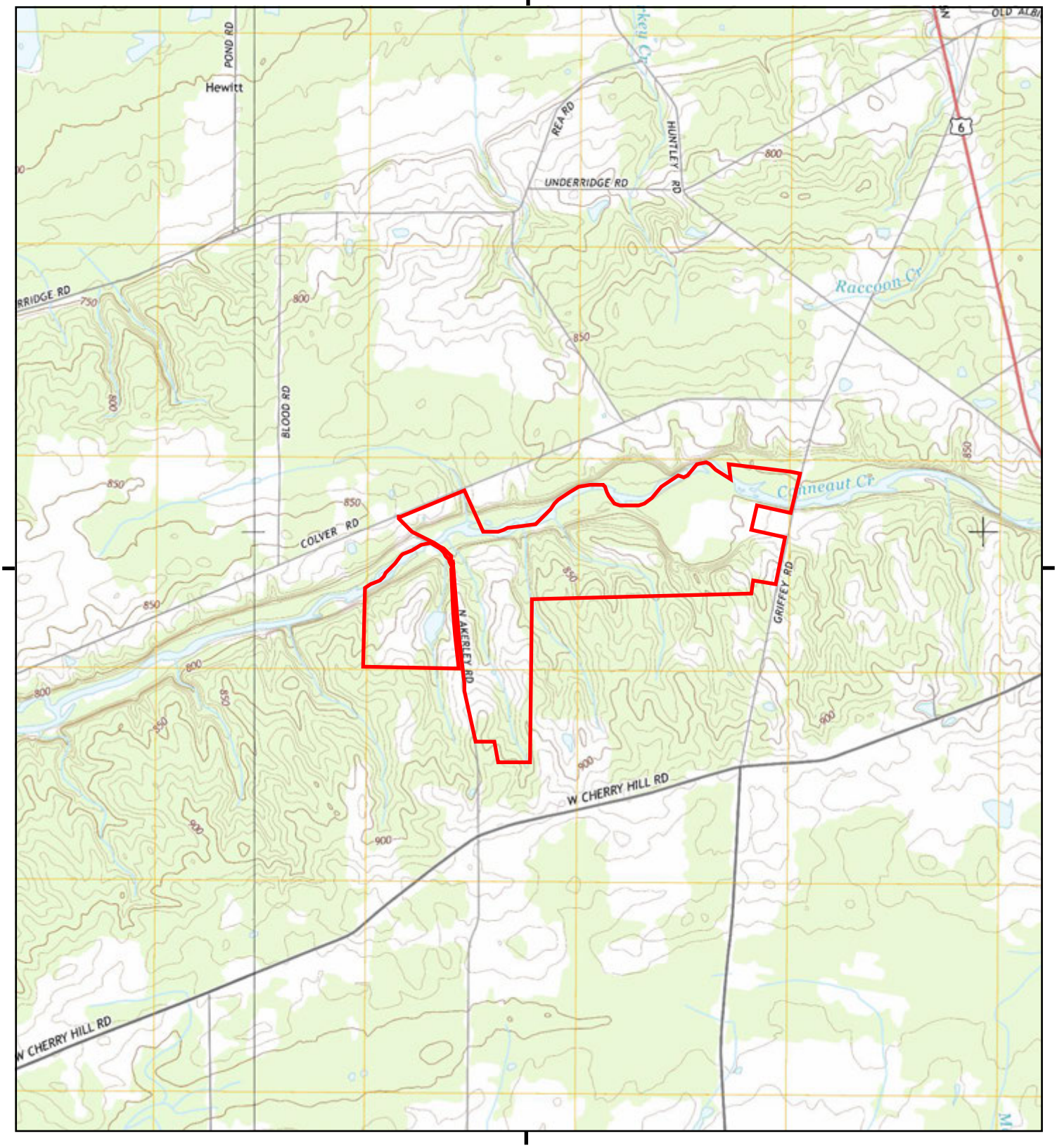
TP, East Springfield, 2016, 7.5-minute
W, Conneaut, 2016, 7.5-minute

SITE NAME: IB Brown Road Study Area and
ADDRESS: 2A Griffey Road Study Area
West Springfield, PA 16443
CLIENT: U.S. Army Corps of Engineers

N

Historical Topo Map

2013



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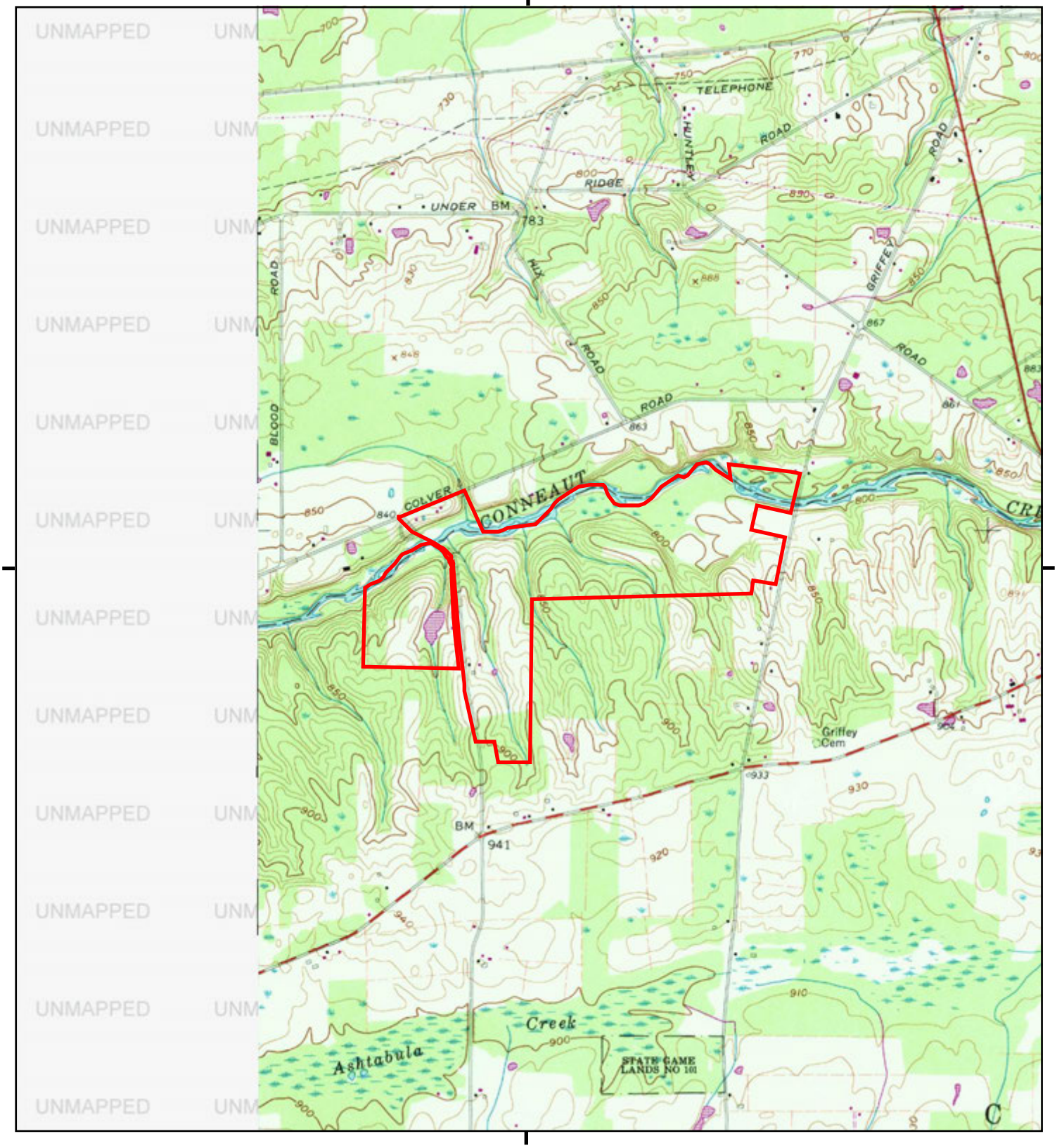
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, East Springfield, 2013, 7.5-minute
W, Conneaut, 2013, 7.5-minute

SITE NAME: IB Brown Road Study Area and
ADDRESS: 2A Griffey Road Study Area
West Springfield, PA 16443
CLIENT: U.S. Army Corps of Engineers

N



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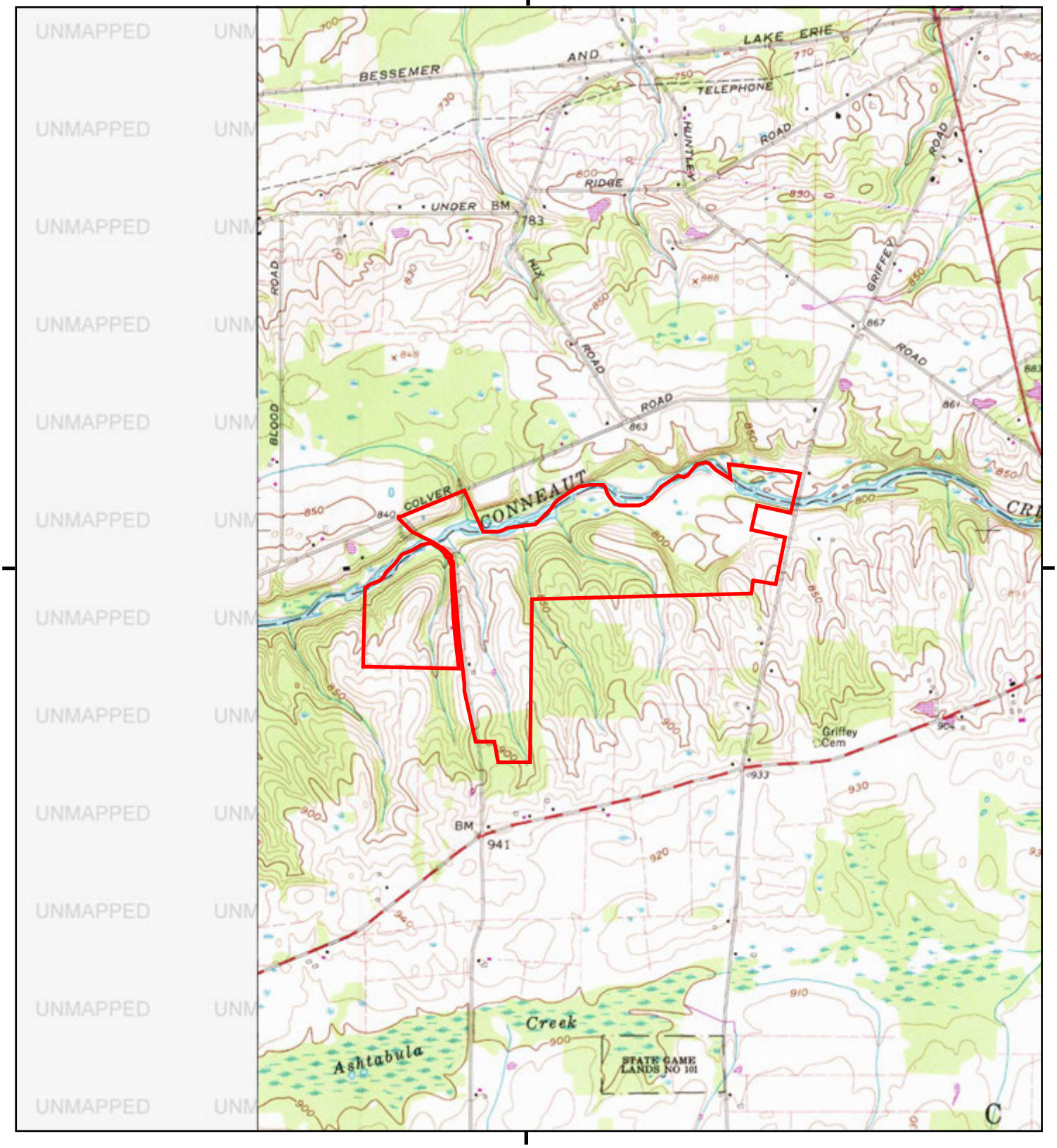
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, East Springfield, 1990, 7.5-minute

SITE NAME: IB Brown Road Study Area and
ADDRESS: 2A Griffey Road Study Area
West Springfield, PA 16443
CLIENT: U.S. Army Corps of Engineers

N



This report includes information from the following map sheet(s).

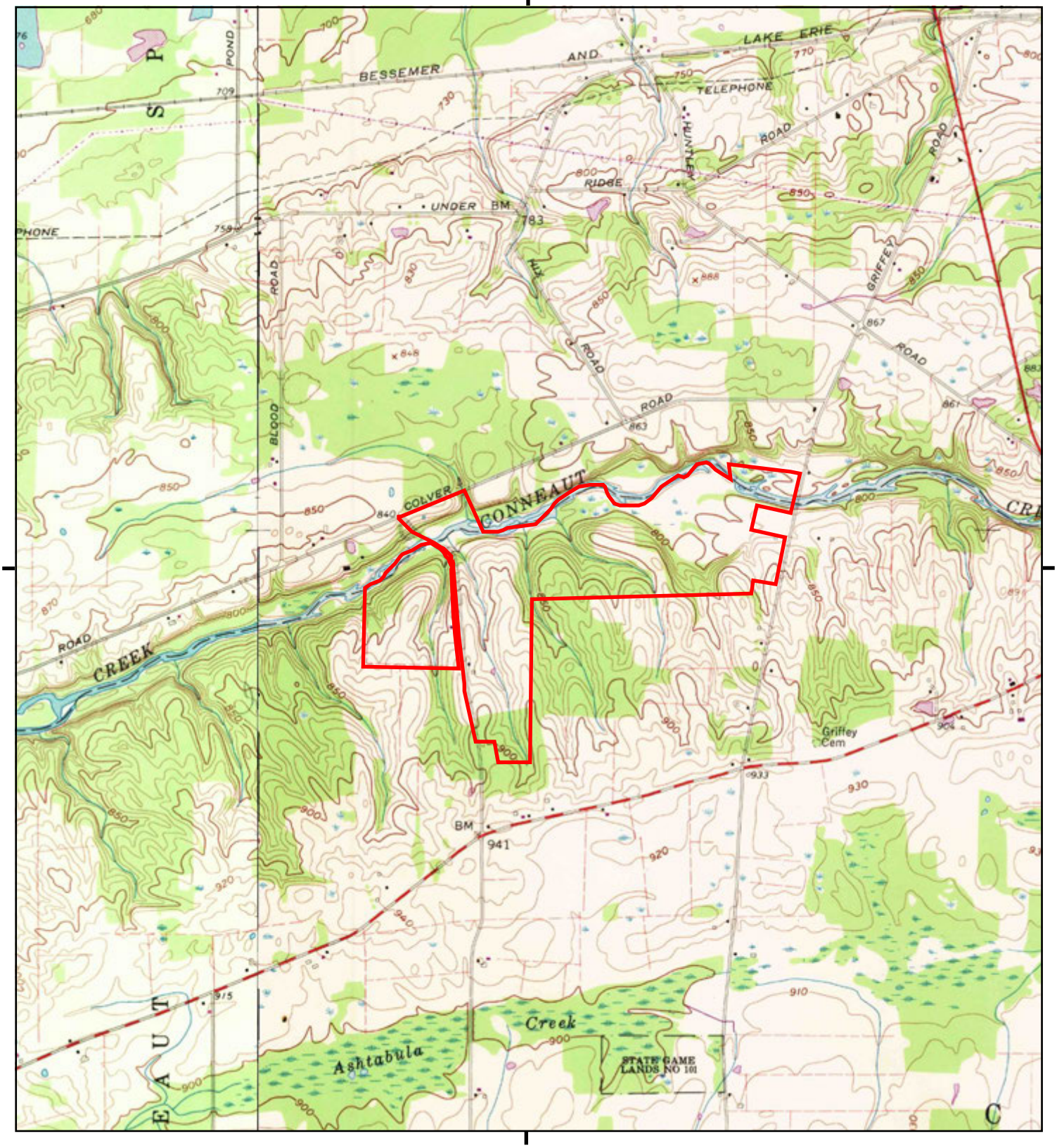
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, East Springfield, 1977, 7.5-minute

SITE NAME: IB Brown Road Study Area and
ADDRESS: 2A Griffey Road Study Area
West Springfield, PA 16443
CLIENT: U.S. Army Corps of Engineers

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

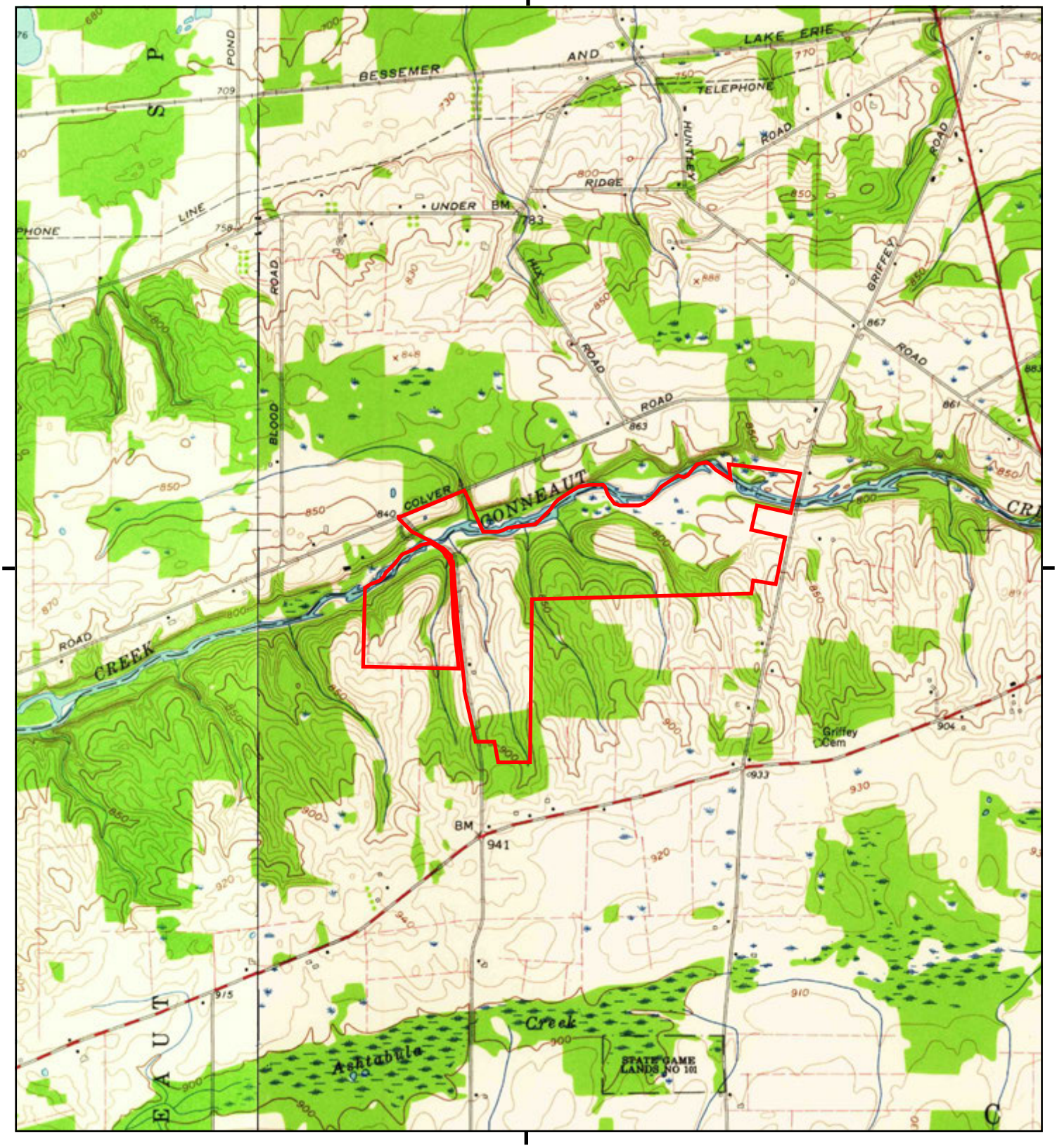
TP, East Springfield, 1969, 7.5-minute
W, Conneaut, 1970, 7.5-minute

SITE NAME: IB Brown Road Study Area and
ADDRESS: 2A Griffey Road Study Area
West Springfield, PA 16443
CLIENT: U.S. Army Corps of Engineers

N

Historical Topo Map

1959, 1960



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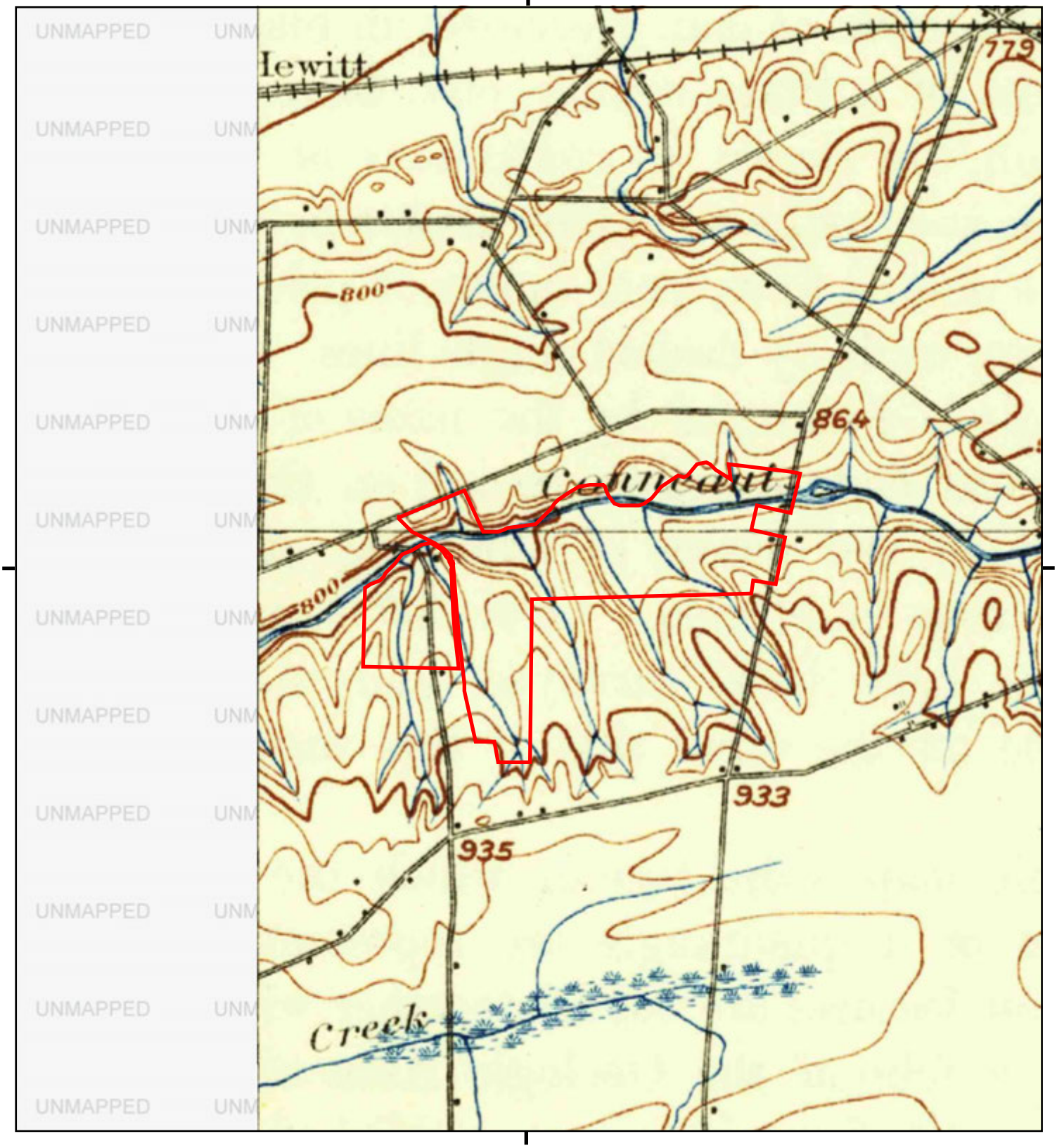
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, East Springfield, 1959, 7.5-minute
W, Conneaut, 1960, 7.5-minute

SITE NAME: IB Brown Road Study Area and
ADDRESS: 2A Griffey Road Study Area
West Springfield, PA 16443
CLIENT: U.S. Army Corps of Engineers

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Girard, 1900, 15-minute

SITE NAME: IB Brown Road Study Area and
ADDRESS: 2A Griffey Road Study Area
West Springfield, PA 16443
CLIENT: U.S. Army Corps of Engineers

N

IB Brown Road Study Area and
2A Griffey Road Study Area
West Springfield, PA 16443

Inquiry Number: 7079489.5
August 11, 2022

The EDR-City Directory Image Report

EDR® Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

TABLE OF CONTENTS

SECTION

Executive Summary

Findings

City Directory Images

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Report is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Report includes a search of available city directory data at 5 year intervals.

RECORD SOURCES

EDR's Digital Archive combines historical directory listings from sources such as Cole Information and Dun & Bradstreet. These standard sources of property information complement and enhance each other to provide a more comprehensive report.

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Data by infoUSA®

RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. A check mark indicates where information was identified in the source and provided in this report.

Year	Target Street	Cross Street	Source
2017	☑	☑	EDR Digital Archive
2014	☑	☑	EDR Digital Archive
2010	☑	☑	EDR Digital Archive
2005	☑	☑	EDR Digital Archive
2000	☑	☑	EDR Digital Archive
1995	☑	☑	EDR Digital Archive
1992	☑	☑	EDR Digital Archive

FINDINGS

TARGET PROPERTY STREET

2A Griffey Road Study Area
West Springfield, PA 16443

Year	*CD Image*	*Source*
GRIFFEY RD		
2017	pg A2	EDR Digital Archive
2014	pg A5	EDR Digital Archive
2010	pg A8	EDR Digital Archive
2005	pg A11	EDR Digital Archive
2000	pg A14	EDR Digital Archive
1995	pg A17	EDR Digital Archive
1992	pg A19	EDR Digital Archive

FINDINGS

CROSS STREETS

Year	*CD Image*	*Source*	
COLVER RD			
2017	pg. A1	EDR Digital Archive	
2014	pg. A4	EDR Digital Archive	
2010	pg. A7	EDR Digital Archive	
2005	pg. A10	EDR Digital Archive	
2000	pg. A13	EDR Digital Archive	
1995	pg. A16	EDR Digital Archive	
1992	pg. A18	EDR Digital Archive	
N AKERLEY RD			
2017	pg. A3	EDR Digital Archive	
2014	pg. A6	EDR Digital Archive	
2010	pg. A9	EDR Digital Archive	
2005	pg. A12	EDR Digital Archive	
2000	pg. A15	EDR Digital Archive	
1995	-	EDR Digital Archive	Street not listed in Source
1992	-	EDR Digital Archive	Street not listed in Source

City Directory Images

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

COLVER RD 2017

13600	FINN, THEODORE J
13626	WADSWORTH, BERNADETTE S
13752	BATEMAN, DOUGLAS K
13771	ZGREBANK, JEFFREY A
13788	PALO, JACOB D
14055	GABUTTI, STEPHEN M
14107	GOSNELL, DAVID
14241	SKEEL, LARRY C
14273	TURNER, DAVID H
14525	STILLEY, CHRIS J
14571	KUCERA, HELMUT W
14691	MACKEY, KARL W
14815	LAW, JEFF M
14879	ARGENY, THOMAS M
14918	HAMMER, ROLAND R
14991	ENGLISH, HEATHER
	HARPST BROS CONSTRUCTION
14999	KING, JAMES E

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

GRIFFEY RD 2017

7422	BREESE, RONALD G
7447	KERSWILL, JOSEPH
7852	LYLE, KATHLEEN M
8024	SANDEN, WESLEY S
8130	ENGLISH, ANTHONY
8135	DANA, STEVEN C
8169	LENHART, SANDRA L
8235	FREEMAN, THOMAS J
8240	BLOOD, DOLORES M
8255	WHEELER, MICHAEL W
8260	EDWARDS, CHAD L
8370	HULLEY, RONALD E
8520	PATTEN, KEVIN P
8568	BROOKS, JOHN E
8585	REED, ROBERT L
8698	ENGLISH, CARL

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

N AKERLEY RD 2017

8351 HAHN, EDWIN R
8599 KAUFFMAN, EMMA M

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

COLVER RD 2014

13600	FINN, THEODORE J
13626	WADSWORTH, RAY P
13677	KITCEY, KAYLE A
13752	BATEMAN, DOUGLAS K
13771	ZGREBANK, JEFFREY A
13788	PALO, JACOB D
14055	GABUTTI, STEPHEN M
14107	PALAGYI, DAVE J
14185	LANDSBERG, DAN M
14241	MCENROE, JOHN D
14273	TURNER, DAVID H
14525	TAYLOR, ERIC P
14571	KUCERA, HELMUT W
14691	MACKEY, KARL W
14815	LAW, JEFF M
14879	ARGENY, GAIL L
14918	OCCUPANT UNKNOWN,
14999	KING, JAMES E

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

GRIFFEY RD 2014

7263	LIOCANO, BERNARD O
7422	OCCUPANT UNKNOWN,
7447	KERSWILL, JOSEPH
7852	LYLE, KATHLEEN M
7951	LIQUID METER COMPANY INC
8024	SANDEN, WESLEY S
8130	ENGLISH, PHYLLIS J
8135	DANA, STEVEN C
8169	LENHART, RICHARD D
8235	FREEMAN, THOMAS J
8240	BLOOD, DOLORES M
8255	WHEELER, MICHAEL W
8260	EDWARDS, CHAD L
8370	HULLEY, RONALD E
8520	PATTEN, PHILIP M
8568	PATTEN, CHERYL A
8585	REED, ROBERT L
8698	ENGLISH, CARL

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

N AKERLEY RD 2014

8351 BAYLER, JONATHON C
HAHN, GEORGE E
HULIHAN, JAMES
8599 WALKER, CHRISTOPHER S

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

COLVER RD 2010

13600	FINN, THEODORE J
13626	MOSIER, KENNETH J
13752	WALTER, CHRISTINE F
13771	ZGREBANK, JEFFREY A
13788	PALO, DENNIS L
14055	GABUTTI, STEPHEN M
14185	LANDSBERG, DAN M
14241	FOSBURG, CHESTER D
14273	TURNER, DAVID H
14411	YOUNGS, ROBERT R
14525	TAYLOR, ERIC P
14571	KUCERA, HELMUT W
14691	MACKEY, KARL W
14815	LAW, JEFF M
14879	ARGENY, THOMAS M
14918	HAMMER, ROLAND R
14991	HARPST, CHRISTOPHER A
14999	KING, JAMES

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

GRIFFEY RD 2010

6605	THAYER, DENNIS D
6699	BEEBE, BRIAN J
7263	LIOCANO, BERNARD O
7422	BREESE, RONALD G
7447	KERSWILL, JOSEPH
7852	LYLE, KATHLEEN M
7951	LIQUID METER CO INC
8024	SANDEN, WESLEY S
8130	ENGLISH, PHYLLIS J
8135	DANA, STEVEN C
8169	LENHART, ALICE M
8235	FREEMAN, THOMAS J
8240	BLOOD, RICHARD A
8255	DUDENHOEFFER, LISA A
8260	BLOOD, JESS C
8370	HULLEY, RONALD E
8520	PATTEN, PHILIP M
8568	PATTEN, KERRY L
8585	REED, ROBERT L
8698	SPAULDING, SUSAN M

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

N AKERLEY RD 2010

8351 HAHN, GEORGE E

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

COLVER RD 2005

13626 MOSIER, KENNETH J
13684 KING, WILLIAM H
13752 WALTER, CHRISTINE F
13771 ZGREBANK, JEFFREY A
13788 PALO, DENNIS L
14055 GABUTTI, STEPHEN M
14107 POHMAN, JAMES A
14185 LANDSBERG, DAN M
14241 FOSBURG, CHESTER D
14273 TURNER, DAVID H
14525 TAYLOR, ERIC P
14571 KUCERA, HELMUT W
14691 MACKEY, MOLLY
14815 LAW, JEFF M
14879 ARGENY, GAIL L
14918 HAMMER, ROLAND L
14991 FROST, WHITNEY
14999 MORRIS, GARY A

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

GRIFFEY RD 2005

6605	THAYER, VIOLET M
6699	BEEBE, BRIAN J
7263	LIOCANO, BERNARD O
7422	BREESE, RONALD G
7447	KERSWILL, JOSEPH
7951	KONOPA, JOHN W
	LIQUID METER CO INC
8024	SANDEN, WESLEY S
8130	ENGLISH, PHYLLIS J
8135	LENHART, RICHARD D
8169	LENHART, ALICE M
8235	FREEMAN, THOMAS J
8240	BLOOD, RICHARD A
8255	DUDENHOEFER, LISA A
8260	BLOOD, JESS C
8370	HULLEY, RONALD E
8568	PATTEN, KERRY L
8585	REED, ROBERT L
8698	SPAULDING, SUSAN M

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

N AKERLEY RD 2005

8250 FELICIJAN, MYRTLE M
8351 HAHN, GEORGE E
8599 BYRNE, JASON

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

COLVER RD 2000

13600	HENCK, ROBERT H
13626	WARNER, GERALD L
13684	KING, WILLIAM H
13752	VORSE, DAVID J
13788	PALO, DENNIS
14055	MCDONALD, PERCY K
14107	POHMAN, JAMES
14241	FOSBURG, CHESTER D
14273	TURNER, DAVID H
14525	TAYLOR, ERIC
14571	KUCERA, HELMUT W
14691	MACKEY, SULO
14815	LAW, JEFFREY M
14879	JONES, LISA D
14918	HAMMER, ROLAND

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

GRIFFEY RD 2000

6699	WHITNEY, LOIS M
7263	LIOCANO, BERNARD O
7422	BREESE, RONALD G
7447	KERSWILL, MARILYN M
7852	CHARLTON, BRUCE G
8024	SANDEN, WESLEY S
8130	ENGLISH, BRUCE
8135	MIRALDI, STEPHEN
8169	LENHART, C T
8235	FREEMAN, THOMAS
8240	BLOOD, RICHARD A
8260	BLOOD, JESS C
8370	HULLEY, RONALD E
8520	PATTEN, PHILIP
8568	PATTEN, KERRY L
8585	REED, ROBERT L
8698	SPAULDING, RANDY

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

N AKERLEY RD 2000

8250 FELICIJAN, MYRTLE
8351 HAHN, GEORGE E

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

COLVER RD 1995

13600	HENCK, ROBERT H
13626	WARNER, GERALD L
13684	KING, WILLIAM H
13752	VORSE, DAVID J
13788	PALO, DENNIS
14055	HOOVER, DENISE
14241	SEATON, JAY
14525	TAYLOR, ERIC
14571	KUCERA, HELMUT W
14918	HAMMER, ROLAND

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

GRIFFEY RD 1995

6699	WHITNEY, ERNEST G
7422	BREESE, RONALD G
7447	KERSWILL, MARILYN M
7852	CHARLTON, BRUCE G
8024	SANDEN, WESLEY S
8169	LENHART, C T

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

COLVER RD 1992

13600 HENCK, ROBERT H
13788 PALO, DENNIS
14411 MAXON, CHARLES
14525 TAYLOR, ERIC
14571 GILLESPIE, J
KUCERA, HELMUT W
14815 LAWRENCE, JANET K

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

GRIFFEY RD 1992

7852 CHARLTON, BRUCE G
8024 SANDEN, WESLEY S
8169 LENHART, C T

Study Area Photos

PA Fish and Boat Commission Property (Conn28)

Photo 1: Grassy area looking toward Griffey Rd bridge

Photo 2: A few tires near Griffey Rd bridge

Photo 3: Tire near Griffey Rd bridge

Photo 4: Tire next to Griffey Rd bridge

Photo 5: Looking upstream under Griffey Rd bridge

Photo 6: Looking upstream under Griffey Rd bridge

Photo 7: Looking downstream next to Griffey Rd bridge

Photo 8: Looking downstream next to Griffey Rd bridge

Photo 9: Overlooking property from Griffey Rd bridge

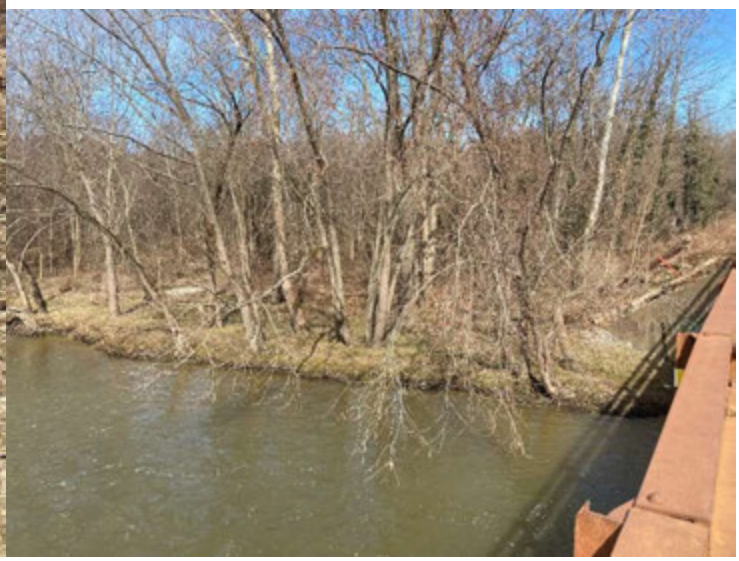

Photo 10: Overlooking property from Griffey Rd bridge

Photo 11: Parking lot

Photo 12: Parking lot

Edwards Property (Conn26)

Photo 13: Overlooking property from Griffey Rd bridge

Photo 14: Effluent from culvert near Griffey Rd bridge

Photo 15: Effluent from culvert near Griffey Rd bridge

Photo 16: Grassy area looking downstream along shoreline

Wheeler Property (Conn30)

Photo 17: Sparse trash

Photo 18: Sparse trash

Photo 19: Pool of standing water

Photo 20: Looking east over large low-lying area

Photo 21: Looking downstream along the shoreline

Photo 22: Looking upstream along the shoreline

Taylor Property (Conn32)

No images

Mikhalak Property (Conn33)

Photo 23: Looking west through open wooded area

Photo 24: Looking east through open wooded area

Photo 25: Looking up a tributary that leads into Conneaut Creek

Photo 26: Miscellaneous trash (basketball for example)

Lee Property (Conn36)

Photo 27: Looking downstream along shoreline

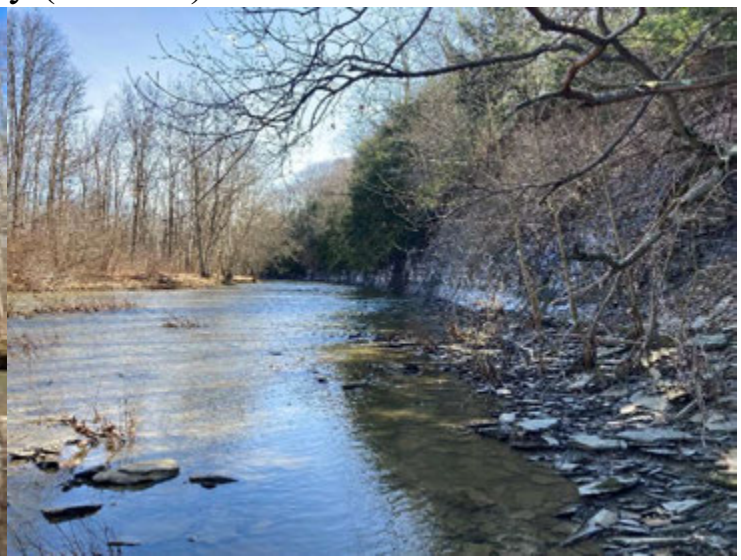

Photo 28: Looking upstream along cliff-lined shoreline

Photo 29: Miscellaneous trash near the cliff-lined shoreline

Photo 30: Miscellaneous trash near the cliff-lined shoreline

Photo 31: Miscellaneous trash, mainly metal roofing, near the cliff-lined shoreline

Carson Property (Conn38)

Photo 32: Tributary leading into Conneaut Creek

Pollick Property (Conn40)

Photo 33: Overlooking a tributary leading to Conneaut Creek

Photo 34: Old water spigot and miscellaneous trash

Photo 35: Steel well casing

Photo 36: Well cover

Photo 37: Small abandoned house near cliff-lined shoreline

Photo 38: Another angle of the old, abandoned house

Photo 39: Remains of wooden porch amongst miscellaneous trash

Photo 40: Inside of house containing deteriorating household items

Photo 41: Old farming equipment

Photo 42: Old farming equipment

Brugger Property (Conn41)

Photo 43: Overview of property (on left) looking upstream from Route 6N bridge

Murphy Property (Conn39)

Photo 44: Looking downstream from Route 6N bridge

Photo 45: Looking west through open wooded area

Shelter Property (Conn37)

Photo 46: Looking west over a channel that branches off the creek

Photo 47: Looking east over a channel that branches off the creek

Yochim Property (Conn35)

Photo 48: Raised wooden shelter, likely used for hunting

Kelly Property (Conn34)

Photo 49: Location of old sugar shack viewed from afar

Photo 50: Closer view of old sugar shack

Photo 51: View of old sugar shack, looking west

Photo 52: Miscellaneous trash near old sugar shack

Photo 53: View of old sugar shack, looking east

Photo 54: Miscellaneous trash around old sugar shack

Photo 55: Tubes running between trees for collection of sap

Photo 56: Old work bench and barrel for maple syrup production

Photo 57: Miscellaneous trash including a pan and metal bucket

Photo 58: Empty metal barrel from maple syrup company

Photo 59: Empty barrel and other miscellaneous trash

Photo 60: Wooden ramp near old sugar shack

Photo 61: Empty plastic buckets

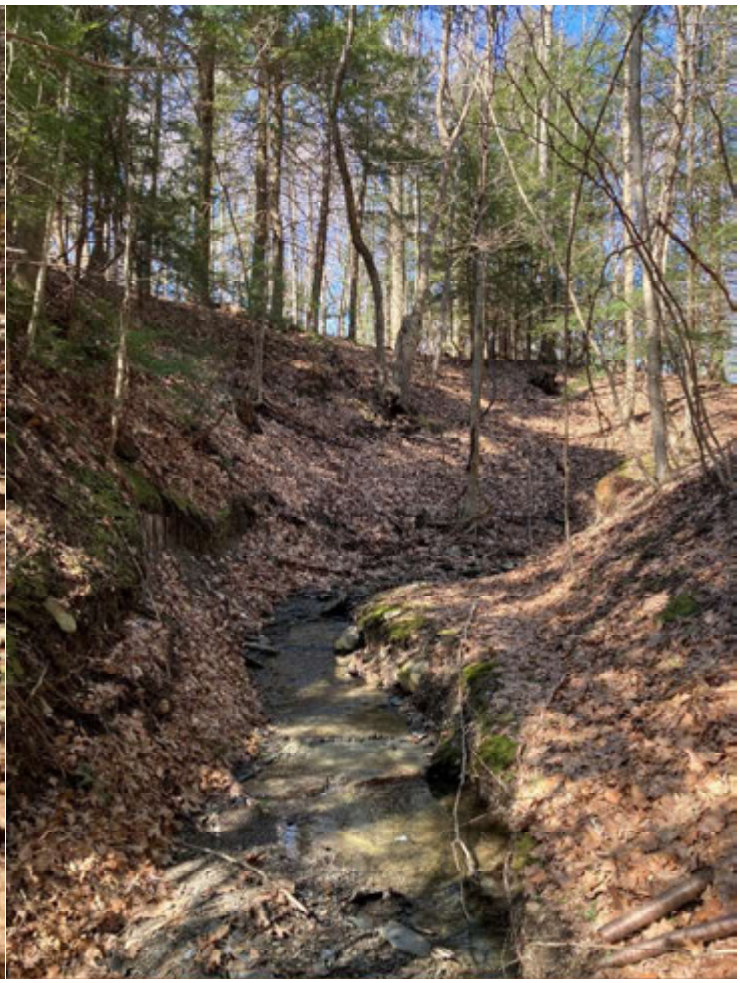

Photo 62: Looking upstream up a tributary

Photo 63: Miscellaneous trash on slope next to tributary

Photo 64: Miscellaneous trash on slope next to tributary

Photo 65: Rusted out washing machine

Photo 66: Rusted out appliance

Photo 67: Miscellaneous bottles and jars on top of slope

Photo 68: Tires, bottles, and jars on top of slope

Konopa Property (Conn31)

Photo 69: Looking upstream from property

Photo 70: Looking downstream from property

Photo 71: Looking west through open wooded area

Photo 72: Looking up a channel that leads to the creek

Lenhart Property (Conn29)

Photo 73: Looking down a channel that leads to the creek

Photo 74: A pile of miscellaneous tires

Photo 75: Pile of tires near Griffey Rd

Environmental Site Assessment Questionnaire

The questionnaire information was provided by:

Name: Michael Wheeler Title: Property Owner

Signature: _____

Date: 08-Mar-2023

ENVIRONMENTAL INFORMATION

PREVIOUS REPORTS, DOCUMENTS AND OWNERS

1. Are you aware if a previous Environmental Assessment has ever been performed on the subject property? If yes, are you aware of the recommendations made in the report or please provide a copy of the report?

☐ Yes ☒ No ☐ Do not Know

2. Do you have any other environmentally associated documents, such as compliance audits, environmental permits (such as an NPDES permit, boiler permit, wastewater permit), registrations (such as for a underground storage tank) or material safety data sheets? If yes, please provide a copy of the document(s)

☐ Yes ☒ No ☐ Do not Know

3. Can you provide contact information (name and phone number) of the previous owner of the property? If yes, please provide below.

☐ Yes ☒ No ☐ Do not Know

HISTORICAL & PRESENT USAGE/SITE CONDITIONS – SUBJECT AND ADJOINING PROPERTIES

1. Are you aware of the prior use of the subject property, i.e., any previous development, undeveloped? If so, please describe. It was likely just farmland. Bought the property as a residential property.

2. Has fill dirt ever been brought onto the subject property that originated from a contaminated site or from an unknown source?

Just gravel for driveway

☐ Yes ☒ No ☐ Do not Know

3. Are there currently or have there ever been any pits, ponds or lagoons on the subject property utilized in connection with waste treatment or waste disposal?

Not too familiar with gas wells, but when gas well was being dug, there was a pit dug for some sort of waste, which was probably water

☒ Yes ☐ No ☐ Do not Know

4. Are you currently aware of or have there ever been any hazardous substances, petroleum products, tires, car or industrial batteries, pesticides or other chemicals or waste materials that have been dumped, buried or burned on the subject property?

☐ Yes ☒ No ☐ Do not Know

5. Have any of the adjoining properties ever been used for industrial purposes? (including but not limited to a gas station, dry cleaner, auto repair facility, landfill, waste treatment, printing facility etc)? If yes, please describe.

☐ Yes ☒ No ☐ Do not Know

6. Are any of the adjoining properties currently being used for industrial purposes? If yes, please describe.

☐ Yes ☒ No ☐ Do not Know

7. Do you have any specialized knowledge or experience related to the property or nearby properties? For example, are you involved in the same line of business as the current or former occupants of the property or an adjoining property so that you would have specialized knowledge of the chemicals and processes used by this type of business?

☐ Yes ☒ No ☐ Not Applicable

8. If the subject property is served by a private well or non-public water system, is there evidence or do you have prior knowledge that contaminants have been identified in the well or system that exceed guidelines applicable to the water system or that the well has been designated as contaminated by any government environmental/health agency? If an on-site well is present, please attach a copy of the most recent water quality testing report.

Property is served by a private well. No knowledge of contamination

☐ Yes ☒ No ☐ Not Applicable

AAI and REGULATORY QUESTIONS

In order to qualify for one of the Landowner Liability Protections offered by the Small Business Liability Relief and Brownfields Revitalization Act of 2001, you must provide the following information (if available). Failure to provide this information could result in a determination that "all appropriate inquiry" is not complete.

1. Are you aware of any past or current existence of hazardous substances, specific chemicals, or petroleum products on the subject property or any facility located on the property?

☐ Yes ☒ No ☐ Do not Know

2. Are you aware of any past or current spills or other chemical releases that have taken place at the property?

☐ Yes ☒ No ☐ Do not Know

3. Do you know of any clean ups (with respect to hazardous substances, specific chemicals, or petroleum products) that have occurred at the property?

☐ Yes ☒ No ☐ Do not Know

4. Are you aware, based on your knowledge of the property, if there are any obvious indicators that point to the presence or likely presence of contamination at the property?

☐ Yes ☒ No ☐ Do not Know

5. Do you have any knowledge of filed or recorded environmental cleanup liens under federals, state or local law or governmental notification relating to past or recurrent violations of environmental laws with respect to the subject property or any facility located on the property?

☐ Yes ☒ No ☐ Do not Know

6. Are there any potential or pending lawsuits or administrative actions concerning a release or threatened release of hazardous substances or petroleum product involving the subject property or any facility located on the property?

☐ Yes ☒ No ☐ Do not Know

7. Are you aware of any areas of activity or use limitations (AULs) such as engineering controls, land use restrictions or institutional controls that are in place at the property and/or have been recorded or filed in a registry under federal, state or tribal law?

☐ Yes ☒ No ☐ Do not Know

8. (Answer this question only if this is an acquisition) Does the purchase price being paid for this property reasonably reflect the fair market value of the property? If there is a difference, have you considered or determined whether the lower price is because contamination is known or believed to be present at the property?

☐ Yes ☐ No ☐ Do not Know

STORAGE TANKS AND DRAINS

1. Are there currently or are you aware if there have ever previously been any registered or unregistered storage tanks, aboveground or underground, located on the subject property? If so, please attach copies of documentation such as tank closure/removal reports, tank tightness tests or registration/regulatory information.

There is an aboveground tank that stores fuel oil ☒ Yes ☐ No ☐ Do not Know

2. Are there currently or are you aware if there have ever previously been any vent pipes, fill pipes, or access ways indicating a fill pipe protruding from the ground on the property or adjacent to any structure located on the subject property?

☐ Yes ☒ No ☐ Do not Know

3. Are there currently or are you aware if there have ever previously been any current evidence of leaks, spills, or staining by substances other than water, or foul odors, associated with any flooring, drains, walls, ceilings, or exposed grounds on the subject property?

☐ Yes ☒ No ☐ Do not Know

TRANSFORMERS AND HYDRAULIC EQUIPMENT

1. Are there are any transformers, capacitors, and/or hydraulic equipment on the subject property?

Transformer on the power line ☒ Yes ☐ No ☐ Do not Know

2. If yes, are there any records indicating the presence or absence of PCBs in this equipment. If so, please attach copies of this documentation.

☐ Yes ☒ No ☐ Do not Know

3. Are the transformers owned by the subject property or by the local utility? If owned by the utility, please note the name of the utility.

Yes, Northwest Rural Electric Cooperative Association

GLFER Conneaut Creek Sea Lamprey Barrier

Records Review and Preliminary Assessment of Potential Properties

21 March 2022

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1. Introduction

1.1 Objective

The objective of this preliminary assessment is to identify recognized environmental conditions (RECs) that would warrant further consideration within and in the immediate vicinity of the properties being contemplated for the development of alternatives to prevent or significantly reduce the numbers of sea lamprey from reaching 369 river miles of spawning habitat in Conneaut Creek.

1.2 Scope of Work

This is a screening level assessment performed mainly through a standard search of federal and state environmental record and available aerial photographic imagery.

2. Site Description

2.1 Area Identification

The study area is in northwestern Pennsylvania and consists of properties adjacent to Conneaut Creek from the Ohio/Pennsylvania border and approximately six miles

eastward. A total of 83 properties (CONN 1 through 83) are being contemplated for the project. The study area and individual properties are depicted within Figures 1 through 4.

2.2 Vicinity Characteristics

In general, the area is rural with minimal development. Most of the study area consists of open fields, forests, and wetland areas, which are more prevalent further upstream in the study area. In addition, further upstream the creek demonstrates more sinuosity. There is a railroad line just outside the study area north of the creek at CONN 77 and 79. Upstream of the study area there is the town of Albion, Pennsylvania.

3. Records Review

Records reviewed for this preliminary assessment were obtained from the Pennsylvania Department of Environmental Protection (PADEP) eMapPA and the US Environmental Protection Agency (USEPA) Enviromapper/Envirofacts geospatial web viewers. Records were searched for listings within and adjacent to the subject properties (CONN 1 through 83). Aerial imagery was viewed utilizing Google Earth.

3.1 Aerial Photos

The aerial images available for review include the years 1985, 1993, 2004, 2005, 2006, 2008, 2009, 2010, 2011, 2012, 2014, 2015, and 2019. The only significant change observed over time was a decrease in the tree cover within the first 2 miles, from the Pennsylvania/Ohio border.

3.2 Database Records

The applicable state (eMapPA) and federal (Envirofacts) environmental databases that were reviewed within the Conneaut Creek search area are described in Attachments A and B, respectively.

4. Findings

The following federal and state environmental databases produced records within the Conneaut Creek search radius:

PADEP - Oil and Gas Locations - Oil and Gas Wells

Conventional oil and gas wells are scattered throughout the entire study area and shown on Figure 5. No records were found indicating any of the sites had past releases or required response actions; however, the construction of a lamprey barrier could cause permanent or seasonal inundation, which could negatively affect the operation wells if a well was inundated. Four wells located within 200 feet from the bank of Conneaut Creek and are less than 850 feet in elevation above sea level. These wells would have the highest likelihood of being inundated and are located within CONN 50, 52, 63, and 74.

PADEP – Storage Tanks – Storage Tanks Inactive

The following inactive storage tank is located within a property adjacent to Conn 11; however, no records indicating a release were found and the inactive tank is approximately a mile south of the creek.

Facility ID: 25-90700
Facility Name: ALBION FORGE
Facility Address1:14800 W CHERRY HILL RD
Facility City: ALBION
Facility State: PA
Facility Zip: 16401-7828
Facility County: Erie
Facility Municipality: Albion Boro
Tank Owner ID:167062
Tank Owner Name: CORNWELL QUALITY TOOLS CO
Tank Owner Address1: 200 N CLEVELAND AVE
Tank Owner City: MOGADORE
Tank Owner State: OH
Tank Owner Zip: 44260-1205
Primary Facility ID: 592741
Site ID: 574383

Land Recycling Cleanup Location – Soil Media

The following land recycling clean up location (brownfield) is located north of Conn 57 and approximately 0.5 miles north of Conneaut Creek. This is an active soil remediation ongoing at the site which appears to be contained to the subject property and no records indicating other site media are impacted.

Primary Facility Name: HARTHAN SITE
Facility Address1: MCKEE RD
Facility City: SPRINGFIELD
Facility State: PA
Facility County: Erie
Site ID: 600459
Primary Facility ID: 625683
Sub Facility Name: HARTHAN SITE-SOIL
Sub Facility ID: 748026
Primary Facility Type: LAND RECYCLING CLEANUP LOCATION
Other Facility ID: 6-25-932-197
Sub Facility Type: SOIL MEDIA
S Other ID: 748026
Site Status: ACTIVE
Primary Facility Status: ACTIVE
Compliance: YES

5. Conclusion

The only RECs along the subject reach of Conneaut Creek that would warrant further evaluation with respect to construction of the sea lamprey barrier are the oil and gas wells located within CONN 50, 52, 63, and 74. It is unlikely that any of these wells are located within the existing 100-year floodplain or would be permanently/seasonally inundated at base flows with the size structure USACE is currently being contemplated; however, this needs to be verified to ensure that the proposed alternatives, would not impact those locations.

Once the feasibility study progresses and specific properties are selected, it is recommended that USACE prepares a full Phase I Environmental Site Assessment, in accordance with ASTM E1527-21, for those properties.

FIGURES

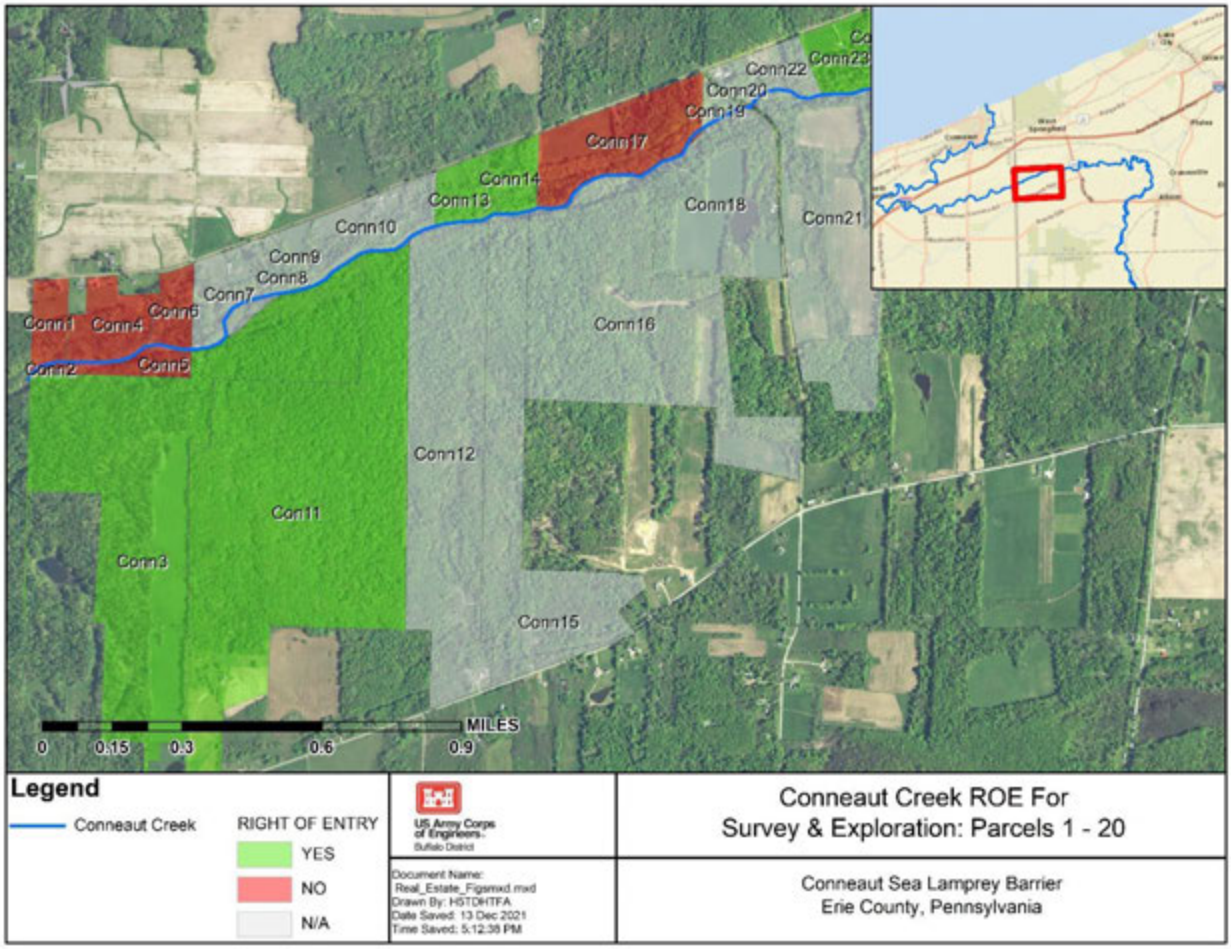


Figure 1 – Study Area - CONN 1-20

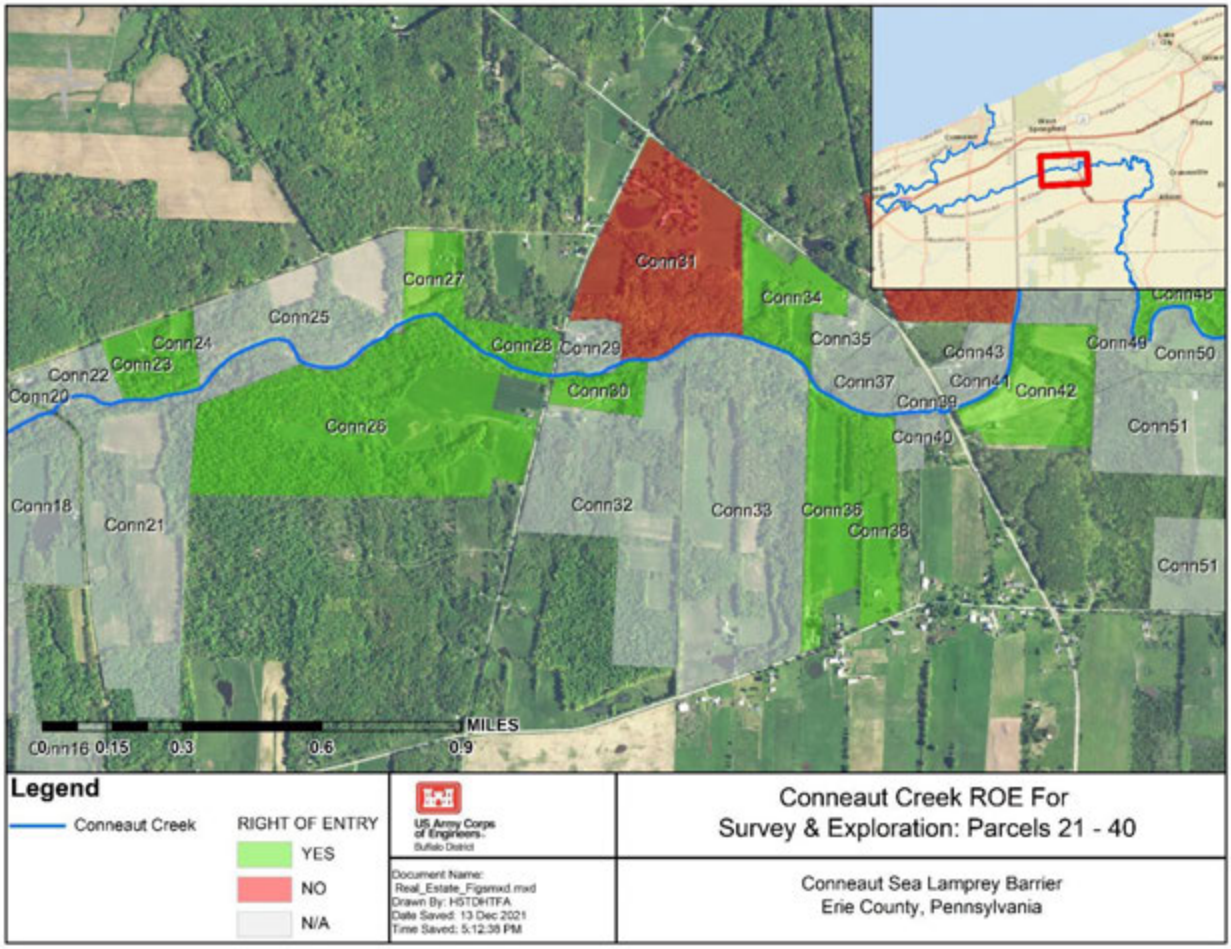


Figure 2 – Study Area - CONN 21-40

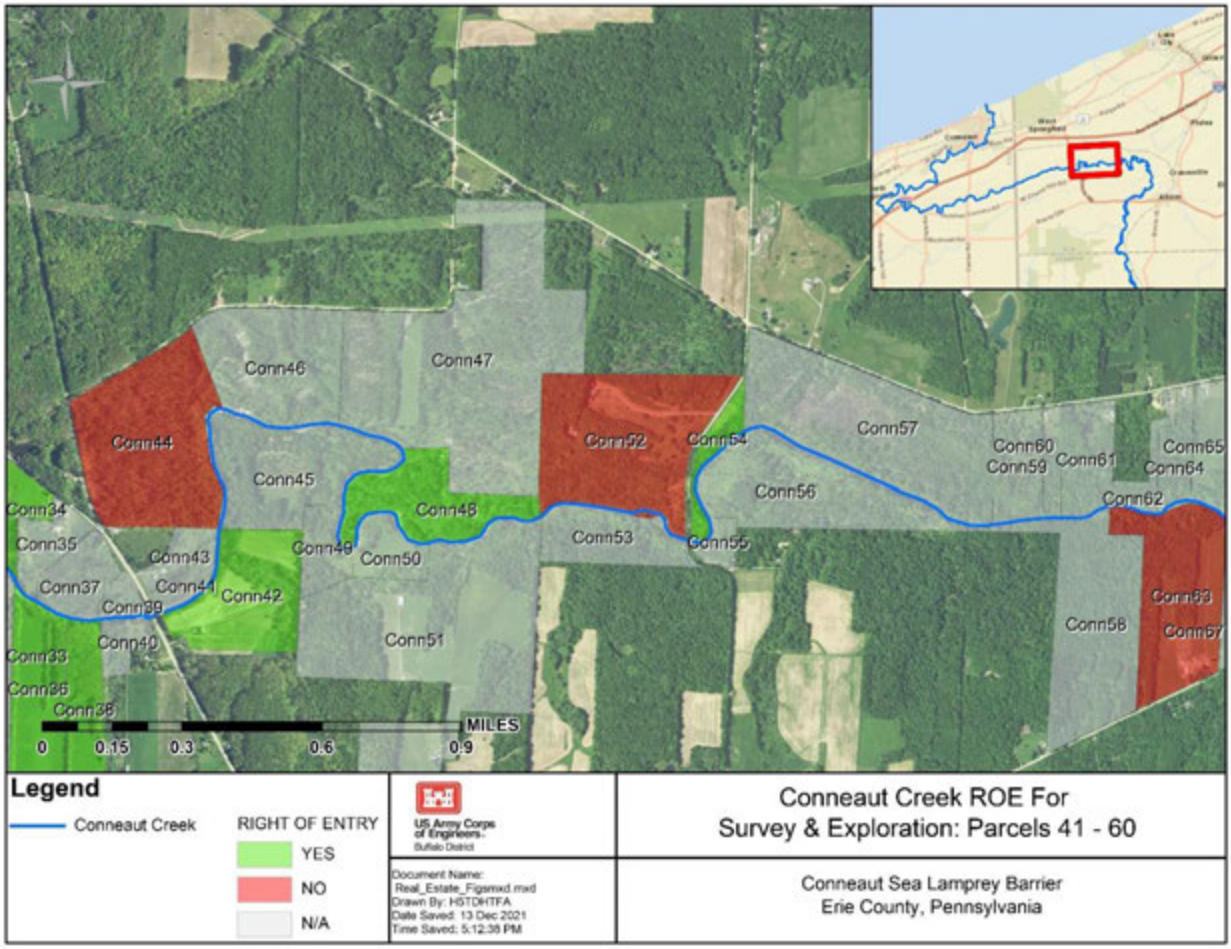


Figure 3 – Study Area - CONN 41-60

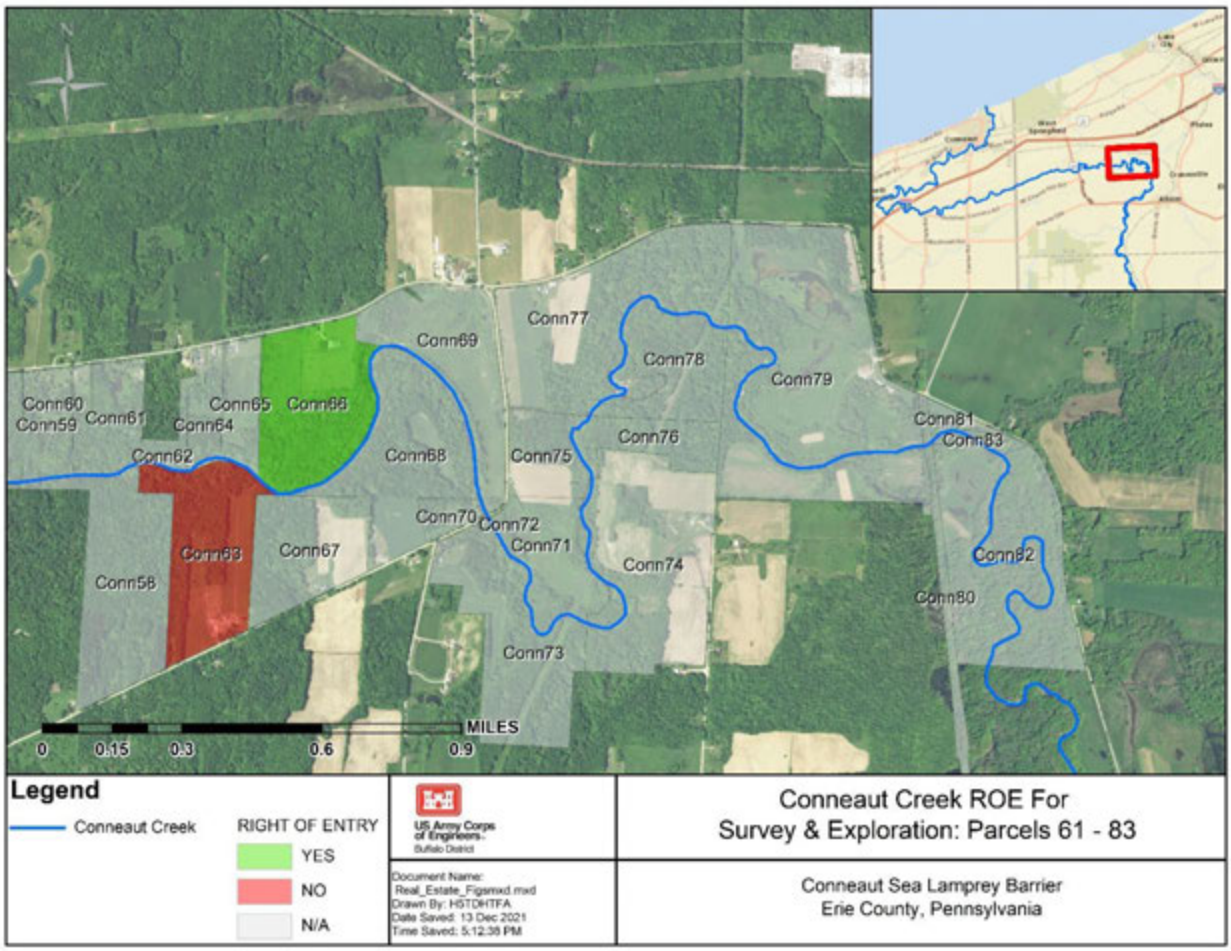


Figure 4 – Study Area – CONN 61-83

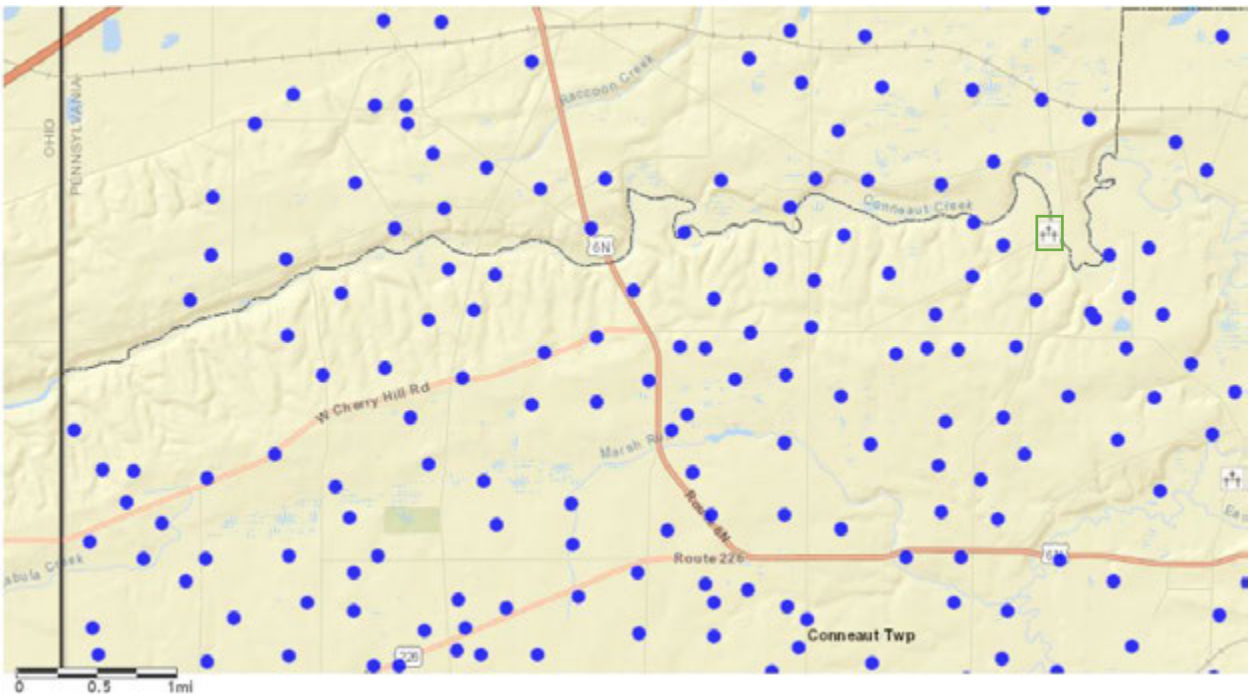


Figure 5 – Study Area - Oil and Gas Well Locations

ATTACHMENTS

Attachment A- Applicable PADEP eMapPA Datasets

https://gis.dep.pa.gov/emappa/Links/eMapPAInfo.htm

Abandoned/Orphaned Wells - Regulated Facilities/Oil and Gas	This layer depicts the locations of abandoned and orphaned wells known by the Pennsylvania Department of Environmental Protection. This information is acquired when orphaned and abandoned wells are discovered by Pennsylvania municipalities, landowners and other agencies and then reported to the Pennsylvania Department of Environmental Protection. When abandoned and orphaned wells are investigated, a scoring is assessed to the well. High priority wells with no responsible party are addressed by the Well Plugging Program. Those wells are analyzed, and occasionally lower priority wells are included if located in close proximity to the high priority wells on well plugging contracts.
AML Inventory Site - Regulated Facilities/Mining	The AML (Abandoned Mine Land) Inventory is a collection of areas where surface features of abandoned mines are present. Presently the data is shown using three layers. AML Inventory Sites is used to show the entire boundary of a problem area. AML Points and AML Polygons are used to show specific problems within a designated inventory site. The inventory does not include complete and comprehensive coverage of abandoned underground mines, surface or underground mines that were permitted and closed after 1982, or active surface or underground mines. For further information concerning mining in your area, please contact the local PADEP office.
Captive Hazardous Waste - Regulated Facilities/Waste	A Captive Hazardous Waste Operation is a PADEP primary facility type related to the Waste Management Hazardous Waste Program. The sub-facility types related to Captive Hazardous Waste Operations that are included in eMapPA are: Boiler/Industrial Furnace, Disposal Facility, Hazardous Generator, Incinerator, Recycling Facility, Storage Facility, and Treatment Facility.

Coal Mining Operation - Regulated Facilities/Mining	A Coal Mining Operation is a PADEP primary facility type related to the Mining Program. The sub-facility types related to Coal Mining Operations that are included in eMapPA are: Coal-Aboveground Storage Tank - aboveground tanks greater than 250 gallons used to store a regulated substance, motor oil or fuel on a coalmine permit. These tanks are regulated under the coal mining regulations since they are specifically exempted from the storage tank regulations. Discharge Point - Discharge of water from an area as a result of coal mining activities. Mineral Preparation Plant - Facility at which coal is cleaned and processed. Mining Stormwater GP - General permit for stormwater discharges associated with coal mining activities in which the main pollutant is sediment. Discharge is not into a High Quality or Exceptional Value designated stream. NPDES Discharge Point - An effluent discharge at a coal mine operation permitted under the National Pollutant Discharge Elimination System. Post Mining Treatment - Post-mining discharges are groundwater seeps and flows that occur after a mine has been completed and reclaimed. Many of these discharges have become contaminated by contacting acid producing rock in the mine environment. Untreated discharges that enter clean streams cause acidification, which immediately kills much of the aquatic life. Coal mines that are predicted to have discharges are not permitted; however, coal mining operators are required to treat post-mining discharges in cases where the predictions do not come true. Through advances in predictive science, less than 2 percent of the permits issued today result in a post-mining discharge. New technologies, including alkaline addition and special handling of acid producing material, are being studied to help address the remaining 2 percent. Refuse Disposal Facility - An area used for disposal or storage of waste coal, rock, shale, slate, clay, and other coal mining related materials. Refuse Reprocessing - Facility at which coal is extracted from waste coal, rock, shale, slate, clay, and other coal mining related material, i.e., coal refuse. Surface Mine - Surface mining of coal by removing material which lies above the coal seam. Includes, but is not limited to, strip, auger, quarry, dredging and leaching mines. Underground Mine - Deep mining of coal. Includes, but is not limited to, portal, tunnel, slope and drift mines.
Commercial Hazardous Waste Operation - Regulated Facilities/Waste	A Commercial Hazardous Waste Operation is a PADEP primary facility type related to the Waste Management Hazardous Waste Program. The sub-facility types related to Commercial Hazardous Waste Operations that are included in eMapPA are: Disposal Facility, Hazardous Generator, Recycling Facility, Storage Facility, and Treatment Facility.

Conservation Wells - Regulated Facilities/Oil and Gas	The conservation well layer identifies the permitted surface location of oil and gas conservation wells that have not been plugged. These include active, regulatory inactive, orphaned, and abandoned wells. A conservation well is any well which penetrates the Onondaga horizon, or in those areas in which the Onondaga horizon is nearer to the surface than thirty-eight hundred feet, any well which exceeds a depth of thirty-eight hundred feet beneath the surface.
Conventional Wells - Regulated Facilities/Oil and Gas	A conventional well is a bore hole drilled or being drilled for the purpose of or to be used for the production of oil or natural gas from only conventional formation(s). A conventional formation is any formation that does not meet the statutory definition of an unconventional formation.
Digitized Mined Area - Regulated Facilities/Mining	Coal mining has occurred in Pennsylvania for over a century. The maps to these coal mines are stored at many various public and private locations (if they still exist at all) throughout the Commonwealth. This dataset tries to identify the mined out areas of the various coal seams in Pennsylvania. This information can be used for many environmental related issues, including mine land reclamation and determination of needs for Mine Subsidence Insurance. The information in this dataset was gathered from mine maps at these various locations so that the data can be readily available to environmental professionals.
Envirofacts Facilities - Federal EPA Sites	This layer displays the location and information about Pennsylvania facilities that are included in the federal Facility Registry System (FRS). FRS is a centrally managed database that identifies facilities, sites, or places subject to environmental regulations or of environmental interest.
Farm Line Maps Well Locations - Regulated Facilities/Oil and Gas	In the 150 years since the first oil well was drilled, an unknown number of oil and gas wells have been drilled in Pennsylvania. An estimate by Independent Petroleum Association of America places that number at approximately 325,000. PADEP is aware of 2,900 Plugged wells, 8,000 Orphaned and Abandoned Wells and 111,000 permitted wells, which leaves over 200,000 wells unaccounted for. Many oil and gas wells are within close proximity to coal mining operations. PADEP's Bureau of Mine Safety and Bureau of Oil and Gas PPM are in a joint endeavor to locate abandoned and orphaned wells in active mining areas. This will allow for proper plugging or avoidance prior to mining operations and prevent gas migration. This process included written correspondence to operators requesting Farm Line Maps, which were then referenced in GIS to real world locations by using the following control points: roads, houses, water bodies and known coordinates. By using GIS, relative

	locations were determined and placed side by side with current ariel photography to determine plausible locations of unknown wells. The following attribute fields apply to the nearest plugged well, abandoned or orphaned well, spudded well and permitted well site to the Farm Line well:Plug_Dist_ft, Plug_Permit, A_O_Dist_ft, A_O_APInum, Spud_dist_ft, Spud_API, Permit_Dist_ft, Permit_API
Groundwater Monitoring Network - Regulated Facilities/Streams & Water/Water Monitoring	Monitoring of groundwater quality in Pennsylvania is usually done near a permitted facility to determine the impacts of the facility on the groundwater, or to monitor as a safeguard for a public water supply well. The Groundwater Monitoring Network layer represents the point locations and data for 1,089 groundwater quality monitoring points sampled under the Fixed Station Network (FSN) and Ambient Survey Groundwater Monitoring Program.
Historical Oil and Gas Well Locations - Regulated Facilities/Oil and Gas	These well locations were derived from historical mine maps known as the WPA, KSheet, and HSheet collections. These locations are provided for informational purposes only and should not be sole means of decision making and are in no way a substitute for actual on the ground observation.
Industrial Mineral Mining Operation - Regulated Facilities/Mining	An Industrial Mineral Mining Operation is a PADEP primary facility type related to the Industrial Mineral Mining Program. The sub-facility types included in eMapPA are: Deep Mine - Underground mining of industrial minerals, i.e., noncoal mining. Includes, but is not limited to, industrial minerals extracted from beneath the surface by means of shafts, tunnels, adits or other mining openings. Discharge Point - Discharge of water from an area as a result of industrial mining activities, i.e. noncoal mining. Mineral Preparation Plant - Facility at which industrial minerals (i.e. noncoal minerals) are cleaned and processed. Mining Stormwater GP - General permit for stormwater discharges associated with industrial mineral mining activities in which the main pollutant is sediment. Discharge is not into a High Quality or Exceptional Value designated stream. NPDES Discharge Point - National Pollutant Discharge Elimination System effluent discharge point for Industrial Mineral (Noncoal) Mine Sites. Post Mining Treatment - Inactive Industrial Mine with a permitted treatment facility. Surface Mine - Surface mining of industrial minerals (i.e. noncoal minerals) by removing material which lies about the industrial minerals. Includes, but is not limited to, strip, augur, quarry, dredging and leaching mines.
Mine Drainage Treatment- Regulated Facilities/Water	Mine Drainage Treatment/Land Reclamation Locations are clean-up projects that are working to eliminate some form of abandoned mine.

Mine Drainage Treatment/Land Recycling Project - Regulated Facilities/Land Reuse	Mine Drainage Treatment/Land Reclamation Locations are clean-up projects that are working to eliminate some form of abandoned mine.
Mine Drainage Treatment/Land Recycling Project - Regulated Facilities/Mining	Mine Drainage Treatment/Land Reclamation Locations are clean-up projects that are working to eliminate some form of abandoned mine.
Monitoring Points - Regulated Facilities/Sample Information System	The Monitoring Points layer is part of the Department's Sample Information System (SIS) that represents discreet locations where numerous samples have been or will be collected. SIS serves as a repository for the results of chemical analyses of samples analyzed by the PADEP Bureau of Laboratories. It also serves as the repository for some self-monitoring samples submitted to the Department.
Municipal Waste Operation - Regulated Facilities/Waste	A Municipal Waste Operation is a PADEP primary facility type related to the Waste Management Municipal Waste Program. The sub-facility types related to Municipal Waste Operations that are included in eMapPA are: Composting, Land Application, Abandoned Landfills, Active Landfills, Processing Facility, Resource Recovery, and Transfer Stations.
Oil and Gas Encroachment Locations - Regulated Facilities/Oil and Gas	An Encroachment Location for Oil & Gas is a PADEP primary facility type related to the Oil and Gas Program. The sub-facilities that fall under Oil and Gas Encroachment also exist under Encroachment Locations. The difference is in the PADEP program that regulates the facilities.
Oil and Gas Encroachment Locations - Regulated Facilities/Water	An Encroachment Location for Oil & Gas is a PADEP primary facility type related to the Oil and Gas Program. The sub-facilities that fall under Oil and Gas Encroachment also exist under Encroachment Locations. The difference is in the PADEP program that regulates the facilities.
Oil and Gas Locations - Regulated Facilities/Oil and Gas	An Oil and Gas Location is a PADEP primary facility type related to the Oil and Gas Program. The sub-facility types related to oil and gas that are included in eMapPA are: Land Application - An area where drilling cuttings or waste are disposed by land application. Pit - An approved pit that is used for storage of oil and gas well fluids. Well - A well associated with oil and/or gas production.
Oil and Gas Water Pollution Control	An Oil and Gas Location is a PADEP primary facility type related to the Oil and Gas Program. The sub-facility types related to Oil and Gas that are included in eMapPA are: Land Application - An area where drilling

Facilities - Regulated Facilities/Oil and Gas	cuttings or waste are disposed by land application. Pit - An approved pit that is used for storage of oil and gas well fluids. Well - A well associated with oil and/or gas production.
Oil and Gas Water Pollution Control Facility- Regulated Facilities/Water	An Oil and Gas Water Pollution Control Facility is a PADEP primary facility type related to the Oil & Gas Program. The following are the sub-facility types related to Water Pollution Control that are included in eMapPA: Discharge point - The outfall from a wastewater treatment facility for oil and gas fluids. Internal Monitoring Point - A monitoring point within the wastewater treatment system where samples are collected. Treatment Plant - A facility for treating oil and gas wastewater to achieve permit effluent limits.
Orphan Mine Discharge - Regulated Facilities/Mining	The Orphan Mine Discharges layer refers to those mine water discharges for which there are no responsible entities to provide treatment of the discharges, and those discharges that do not have a funding mechanism (e.g. trust fund) in place to cover perpetual treatment. Emphasis and priority for remediation is placed on discharges that have the potential for recycling and reuse (i.e. high volume) and those that have the potential for third party treatment or abatement using waste or co-product materials.
Orphan Mine Discharges- Regulated Facilities/Water	The Orphan Mine Discharges layer refers to those mine water discharges for which there are no responsible entities to provide treatment of the discharges, and those discharges that do not have a funding mechanism (e.g. trust fund) in place to cover perpetual treatment. Emphasis and priority for remediation is placed on discharges that have the potential for recycling and reuse (i.e. high volume) and those that have the potential for third party treatment or abatement using waste or co-product materials.
Radiation Facility - Regulated Facilities/Radiation	A Radiation Facility is a PADEP primary facility type related to the Radiation Protection Program. The sub-facility types related to radiation that are included in eMapPA are listed below. Note that Radioactive Material is not included on the external eMapPA website. Accelerator - Electronic machine producing high energy radiation. General Licensed Material - A General License is another radioactive material license. A General License utilizes Radiation Facility for the Primary Facility and uses General License material in lieu of radioactive materials (RAM) for the sub facility. Mammography Quality Standards Act Tube - Specialized X-ray equipment for mammography. Radioactive Material - a facility where radioactive material may be used or stored. X-ray Machine - A facility where X-ray machines other than accelerators are used.

Residual Waste Operation - Regulated Facilities/Waste	A Residual Waste Operation is a PADEP primary facility type related to the Waste Management Residual Waste Program. Residual waste is waste generated at an industrial, mining, or wastewater treatment facility. The sub-facility types related to residual waste that are included in eMapPA are: Generator, Impoundment, Incinerator, Land Application, Landfill, Processing Facility, and Transfer Station.
Sample Points - Regulated Facilities/Sample Information System	This data layer represents the locations where samples have been taken. This layer will not contain all sample locations and results in the Commonwealth because most of the older sample records do not contain information sufficient to determine the location of the sample.
Storage Tank Location - Regulated Facilities/Storage Tanks	A Storage Tank Location is a PADEP primary facility type, and its sole sub-facility on eMapPA is the storage tank itself. Storage tanks are aboveground or underground and are regulated under Chapter 245 pursuant to the Storage Tank and Spill Prevention Act. Storage tanks currently contain, have contained in the past, or will contain in the future, petroleum, or a regulated hazardous substance.
Toxic Release Inventory - Federal EPA Sites	The Toxic Release Inventory (TRI) is provided by the Environmental Protection Agency as a result of the Emergency Planning and Community Right-to-Know Act of 1986 and expanded by the Pollution Prevention Act of 1990. The layer contains points where toxic chemicals are stored. Industries are required to annually report the location and quantity of all toxic chemicals to EPA in an effort to prepare for chemical-spill related emergencies. For more information relating to Toxic Release Inventory, visit the Environmental Protection Agency's website.
Unconventional Wells - Regulated Facilities/Oil and Gas	An unconventional gas well is a bore hole drilled or being drilled for the purpose of or to be used for the production of natural gas from an unconventional formation. Unconventional formation is a geological shale formation existing below the base of the Elk Sandstone or its geologic equivalent stratigraphic interval where natural gas generally cannot be produced at economic flow rates or in economic volumes except by vertical or horizontal well bores stimulated by hydraulic fracture treatments or by using multilateral well bores or other techniques to expose more of the formation to the well bore.

Water Pollution Control Facility- Regulated Facilities/Water	A Water Pollution Control Facility is a PADEP primary facility type related to the Water Pollution Control Program. The sub-facility types related to Water Pollution Control that are included in eMapPA are: Agricultural Activities - The management and use of farming resources to produce crops, livestock, or poultry. Biosolids Treatment - Indicates that the facility treats sewage sludge to produce a material that can be beneficially used, biosolids. Compost/Processing - Indicates that the facility treats sewage sludge by composting to produce a material that can be beneficially used, biosolids. Conveyance System - Sewage system without treatment. Discharge Point - Discharge point to stream. Groundwater Monitoring Point. Internal Monitoring Point - Used to monitor internal processes - not a discharge. Land Discharge - Land application of wastewater. Manure Management - Activities related to or supporting storage, collection, handling, transport, application, planning, record keeping, generation or other manure management activities. Outfall structure - Outfall structure to stream. Pesticide Treatment Area - These SFs are created to address treatment areas that in reality are often an entire water body, such as a pond. The latitude/longitude coordinates are supposed to be entered at the mid-point or center of the treatment area. Pipeline or Conduit - Pipes or other smaller diameter conveyances that are used to transport or supply liquids or slurries from collection, storage or supply facilities or areas to other facilities or areas for storage, modification, or use. These can be for longer-term, medium-term, or short-term and would include design, capacity, maintenance, safety, inspection, accident and varying use, and weather considerations. Production Service Unit - Catch all sub-facility that covers a variety of industries participating in a multitude of activities such as concentrated animal feeding, pharmaceuticals, paper, steel, utilities, etc. The majority of PSUs are classified as Industrial Waste or Stormwater-Industrial (Primary Facility kind). Pump Station - Sewage pump station. Septage Land Application - Indicates that the septage hauler treats residential septage for land application, meaning that it can be applied to land as a soil amendment/fertilizer. Storage Unit - Storage of wastewater. Treatment Plant - Sewage or industrial wastewater treatment plant.

Attachment B Applicable USEPA Envirofacts Datasets

https://www.epa.gov/enviro/about-data

Brownfields-Cleanups	Accidents, spills, leaks, and past improper disposal and handling of hazardous materials and wastes have resulted in tens of thousands of sites across our country that have contaminated our land, water (groundwater and surface water), and air (indoor and outdoor). These contaminated sites can threaten human health as well as the environment. More information on Brownfields.
Cleanups in My Community (CIMC)	Cleanups in My Community is a mapping and listing tool that shows sites where pollution is or has been cleaned up throughout the United States. It maps, lists, and provides cleanup progress profiles for: * Sites, facilities and properties that have been contaminated by hazardous materials and are being, or have been, cleaned up under the Superfund, RCRA or Brownfields cleanup programs. * Federal facilities that have been contaminated by hazardous materials and are being, or have been, cleaned up under the Superfund or RCRA cleanup programs. More information on CIMC.
Resource Conservation and Recovery Act Information	Hazardous waste generators, transporters, treaters, storers, and disposers of hazardous waste are required to provide information on their activities to state environmental agencies. These agencies then provide the information to regional and national US Environmental Protection Agency (EPA) offices through the Resource Conservation and Recovery Act Information (RCRAInfo) System. Information on cleaning up after accidents or other activities that result in a release of hazardous materials to the water, air or land must also be reported through RCRAInfo. More information on RCRAInfo.
Superfund Enterprise Management System (SEMS)	Superfund is a program administered by the EPA to locate, investigate, and clean up uncontrolled hazardous waste sites throughout the United States. More information on SEMS.
Toxics Release Inventory (TRI)	The Toxics Release Inventory (TRI) tracks the management of over 650 toxic chemicals that pose a threat to human health and the environment. U.S. facilities in different industry sectors that manufacture, process, or otherwise use these chemicals in amounts above established levels must report how each chemical is managed through recycling, energy recovery, treatment, and environmental releases. (A “release” of a chemical means that it is emitted to the air or water or placed in some type of land disposal.) The information submitted by facilities to the EPA and states is compiled annually as the Toxics Release Inventory or TRI and is stored in a publicly accessible database. More information on TRI.
Toxic Substances Control Act (TSCA)	The Toxic Substances Control Act provides EPA with the authority to require reporting, record-keeping and testing requirements, and restrictions relating to chemical substances and/or mixtures. More information on TSCA.

RadNet	The RadNet (formerly the Environmental Radiation Ambient Monitoring System (ERAMS)) is a national network of monitoring stations that regularly collect air, precipitation, and drinking water samples for analysis of radioactivity. The RadNet network has been used to track environmental releases resulting from nuclear emergencies and to provide baseline data during routine conditions. Data generated from RadNet provides the information base for making decisions necessary to ensure the protection of public health. More information on RadNet.
Facility Registry Service	The Facility Registry Service (FRS) is a centrally managed database that identifies facilities, sites, or places subject to environmental regulations or of environmental interest. FRS creates high-quality, accurate, and authoritative facility identification records through rigorous verification and management procedures that incorporate information from program national systems, state master facility records, data collected from EPA's Central Data Exchange registrations and data management personnel. More information on FRS.

US Army Corps of Engineers®
Buffalo District

CONNEAUT CREEK SEA LAMPREY BARRIER PROJECT
P2# 495058

Section 506 – Water Resources Development Act of 1992, as amended Great Lakes Fishery and Ecosystem Restoration

Erie County, Pennsylvania

Appendix A-8:
Real Estate Plan

Conneaut Creek Great Lakes Fishery and Ecosystem Restoration (GLFER) Sea Lamprey Barrier
Section 506 of the Water Resources Development Act (WRDA) of 2000
Erie County, Pennsylvania

REAL ESTATE PLAN

1. PURPOSE

This Real Estate Plan (REP), prepared in accordance with ER 405-1-12, presents the real estate requirements for the Conneaut Creek Great Lakes Fishery and Ecosystem Restoration (GLFER) Sea Lamprey Barrier Project and supports the Conneaut Creek GLFER Sea Lamprey Barrier Project Report. This Plan is tentative in nature, subject to change, and is preliminary for planning purposes only. The Plan includes estimated land values and costs associated with the acquisition of lands, easements, and rights-of-way, relocations and disposal areas (LERRDs) required for construction and operation and maintenance of the recommended Plan. It also identifies any facility/utility relocations necessary to implement the project. The final real property acquisition lines and real estate cost estimates provided herein are subject to change based on the final project design.

Section 506 of the Water Resources Development Act (WRDA) of 2000, as amended by Section 5011 WRDA 2007, authorizes the USACE to develop a plan for activities that support the management of Great Lakes fisheries in cooperation with the signatories to the Joint Strategic Plan for Management of the Great Lakes Fisheries and other affected interests. This Plan is referred to as the "Support Plan" and it provides guidance for the planning, design, construction, and evaluation of projects to restore the fishery, ecosystem, and beneficial uses of the Great Lakes in cooperation with other Federal, State, and local agencies and the Great Lakes Fishery Commission. Costs for the planning, design, construction, and evaluation of restoration projects are cost-shared 65 percent Federal and 35 percent Non-Federal. Non-Federal interests may contribute up to 100 percent of their share for projects in the form of lands, easements, right of ways, relocations and soil borrow and disposal areas, plus other materials, supplies, or work in-kind contributions. Non-Federal interests will receive credit for lands, easements, rights–of – way, relocations, and any dredged material disposal areas needed for project construction and must be responsible for the operation, maintenance, repair, rehabilitation, and replacement of projects. Non-Federal interests may include private and non-profit entities.

The Non-Federal Sponsor for this project is the Great Lakes Fishery Commission (GLFC). The need for the proposed Federal action arises from the need to control the invasive sea lamprey in the Great Lakes by reducing sea lamprey production, while allowing native fish access to prime riverine spawning areas. Sea lamprey control is paramount in restoring and maintaining the ecosystem and the robust fishery of the Great Lakes by protecting native and desirable fish from sea lamprey predation. Objectives for this project include 1) Providing a more efficient and effective means to prevent or significantly reduce the numbers of sea lamprey from reaching approximatley 50 river miles of spawning habitat in Conneaut Creek, 2) Reduce the need to use

lampricide, thereby reducing impacts to native species of Conneaut Creek, 3) Maintain or improve the stream habitat quality for desirable fish species.

The selected plan involves constructing a seasonally operated adjustable low crest barrier that uses an Obermeyer gate and electrical barrier with trap and sort and jumping pool at Griffey Road to provide more efficient and effective means to prevent or significantly reduce the numbers of sea lamprey from reaching spawning habitat in Conneaut Creek. This barrier will effectively limit sea lamprey migration into Conneaut Creek, thereby reducing or eliminating the need for lampricide treatments. Reductions in the use of lampricide will protect native species from potential impacts of this chemical while still protecting the Lake Erie fishery from negative impacts associated with sea lamprey invasion. Furthermore, implementation of a barrier on Conneaut Creek will protect the East Branch of Conneaut Creek from sea lamprey invasion should the Bessemer Dam fail. This protection will also benefit the northern brook lamprey population in the East Branch by preventing the need for chemical application in the tributary.

This plan also effectively limits sea lamprey migration while minimizing impacts to property owners along Conneaut Creek. This plan utilizes a seasonally operated low crest barrier to limit sea lamprey migration. The low crest height minimizes upstream inundation and avoids creation of a life safety risk that may result from taller barriers. Seasonal operation of the barrier also allows the barrier to be lowered to the streambed outside of the sea lamprey migration season, returning Conneaut Creek to uninhibited flow conditions. When the barrier is lowered, associated inundation on upstream properties will return to preconstruction conditions. As such, the selected plan maximizes ecological benefit while minimizing burdens to upstream property owners.

There are no prior Real Estate Plans completed for this Project.

2. LERRD REQUIRED

There are four types of standard estates needed to complete the project. These four standard estates are FEE, ROAD EASEMENT, TEMPORARY WORK AREA EASEMENT, and FLOWAGE EASEMENT. The FEE portion of this projects is contained to two properties (One public and one private) and contains the footprint of the Sea Lamprey Barrier. The ROAD EASEMENT is on public property and will be utilized for access to the structure. The TEMPORARY WORK AREA EASEMENT is on public property immediately next to the Sea Lamprey Barrier structure to help facilitate the construction of the structure. Finally, a FLOWAGE EASEMENT is required to compensate private landowners for the areas of their properties that will be inundated upstream as a result of the construction of the Sea Lamprey Barrier.

FEE **0.629 ACRES**

The fee simple title to (the land described in Exhibit A) (Tracts Nos 39025093000500 and 04002002000200), Subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

ROAD EASEMENT **0.088 ACRES**

A perpetual exclusive and assignable easement and right of way in, on, over and across (the land described in Schedule A) (Tracts Nos. 39025093000500) for the location, construction, operation, maintenance, alteration replacement of (a) road(s) and appurtenances thereto; together with the right to trim, cut, fell and remove therefrom all trees, underbrush, obstructions and other vegetation, structures, or obstacles within the limits of the right of way; (reserving, however, to the owners, their heirs and assigns, the right to cross over or under the right of way as access to their adjoining land at the locations indicated in Schedule B); subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

TEMPORARY WORK AREA EASEMENT 0.089 ACRES

A temporary easement and right of way in, on, over and across (the land described in Schedule A) (Tracts Nos. 39025093000500), for a period not to exceed 5 years, beginning with date possession of the land is granted to the United States, for use by the United States, its representatives, agents, and contractors as a work area, including the right to move, store and remove equipment and supplies, and erect and remove temporary structures on the land and to perform any other work necessary and incident to the construction of the Conneaut Creek Great Lakes Fishery and Ecosystem Restoration (GLFER) Sea Lamprey Barrier Project, together with the right to trim, cut, fell and remove therefrom all trees, underbrush, obstructions, and any other vegetation, structures, or obstacles within the limits of the right of way; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

FLOWAGE EASEMENT (PERMANENT FLOODING) 4.13 ACRES

The perpetual right, power, privilege and easement permanently to overflow, flood and submerge (the land described in Schedule A) Tracts Nos. 39023092000200, 04002003000103, 39023092000100, 04002003000100, 04002003000200, and PDOT Right of Way), in connection with the operation maintenance of the project as authorized by Section 506 of the Water Resources Development Act (WRDA) of 2000 and the continuing right to clear and remove and brush, debris and natural obstructions which, in the opinion of the representative of the United States in charge of the project, may be detrimental to the project, together with all right, title and interest in and to the timber, structures and improvements situate on the land provided that no structures for human habitation shall be constructed or maintained on the land, that no other structures shall be constructed or maintained on the land except as may be approved in writing by the representative of the United States in charge of the project, and that no excavation shall be conducted and no landfill placed on the land without such approval as to the location and method of excavation and/or placement of. landfill; the above estate is taken subject to existing easements for public roads and highways, public utilities, railroads and pipelines; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used and enjoyed without interfering with the use of the project for the purposes authorized by Congress or abridging the rights and easement hereby acquired; provided further that any use of the land shall be subject to Federal and State laws with respect to pollution.

Parcel ID	Estate	Acres	Ownership
39025093000500	Fee	0.359	Commonwealth of Pennsylvania
39025093000500	Road Easement	0.088	Commonwealth of Pennsylvania
39025093000500	Temporary Work Area Easement	0.089	Commonwealth of Pennsylvania
04002002000200	Fee	0.27	Edwards
PDOT Right of Way	Flowage Easement (Permanent Flooding)	0.15	Pennsylvania Department of Transportation
39023092000200	Flowage Easement (Permanent Flooding)	1.33	Lenhart
04002003000103	Flowage Easement (Permanent Flooding)	1.06	Wheeler
39023092000100	Flowage Easement (Permanent Flooding)	1.01	Konopa
04002003000100	Flowage Easement (Permanent Flooding)	0.4	Taylor
04002003000200	Flowage Easement (Permanent Flooding)	0.18	Mihalak

3. SPONSOR-OWNED LAND

There is no Non-Federal Sponsor owned land within the project footprint.

4. NON-STANDARD ESTATES

No Non-Standard Estates are anticipated for this project.

5. EXISTING FEDERAL PROJECTS

There are no existing Federal projects located within the project footprint.

6. FEDERAL-OWNED LAND

There is no Federally-owned land located within the project footprint.

7. NAVIGATION SERVITUDE

Navigation Servitude will not be utilized for this project.

8. PROJECT LOCATIONS AND MAPS

The Conneaut Creek watershed is located in the extreme northeast corner of Ashtabula County, Ohio and northwestern Pennsylvania. Of the 191.2 square mile watershed, 153.5 sq mi, including most of the headwater streams, are located in Pennsylvania. The Conneaut Creek main stem originates south of Conneautville in Crawford County, Pennsylvania. In general, Conneaut Creek flows in a northwesterly direction towards Kingsville, Ohio. The river then turns and flows northeast to the city of Conneaut, where it enters Lake Erie. The main stem of the river is 56.8 miles in length with 23.8 of those miles in Ohio. The focus of this project is the mainstem of Conneaut Creek in Pennsylvania between the Ohio-Pennsylvania border at river mile (39.1) and the confluence of the East Branch of Conneaut Creek.

Conneaut Creek and its associated tributaries within Pennsylvania provide high quality stream habitat making it one of the most biologically diverse tributaries to Lake Erie. Because Conneaut Creek has not experienced the adverse impacts of industrial contamination and land development like many other Lake Erie watersheds, Conneaut Creek still has an extensive forested corridor and overall good water quality. The creek supports a high diversity of native fish, freshwater mussel, amphibian, reptile, and bird species. The creek also supports extensive floodplain wetland complexes. Conneaut Creek is a popular destination for anglers for its seasonal populations of steelhead, smallmouth bass, walleye, and northern pike. Currently, Conneaut Creek provides an important fishery of local and statewide significance.

A real estate map is attached to this plan and is identified as “Exhibit A”.

9. INDUCED FLOODING

The hydraulic analysis indicates that there will be induced flooding upstream of the project area as a result of the barrier. A takings analysis was set to be conducted on 1 October 2023 by the USACE Office of Counsel. The takings analysis is currently on hold because of a recent court decision in the US Court of Appeals. It is currently being assumed, for the purposes of this Real Estate Plan, that a permanent flowage easement will be needed on 7 properties directly upstream of the sea lamprey barrier for induced flooding. These 7 properties are the same 7 properties that were included as part of the appraisal for this Real Estate Plan.

The USACE Office of Counsel does not currently have a time frame for when the takings analysis will be resumed.

10. BASELINE COST ESTIMATE

The value of the lands, relocations, and disposal areas required for the Project was determined by a cost estimate by the U.S. Army Corps of Engineers District Appraiser on or about August 10, 2023. The type of appraisal was determined in accordance with Planning Guidance Letter No. 31.

The estimated value of LERRD is a preliminary estimate which may decrease or increase upon completion of an appraisal. In addition to the limitations of the valuation processes and methods

used to develop the estimates, there are areas of risk identified that potentially could impact the estimates significantly. To the extent possible, these risk items have been quantified and added as incremental costs.

The Federal administrative costs are estimated to be $50,000. This includes funds for NFS oversight, landowner's meetings, and review of utility relocation agreements. This amount is an estimate and may increase or decrease based on actual acquisition and oversight needs.

The estimated costs for this Project are as follows:

Estate	Acres	Costs
Fee	0.629	$5,000.00
Road Easement	0.088	$1,400.00
Temp Work Area Easement	0.089	$3,400.00
Flowage Easement (Permanent Flooding)	4.13	$33,000.00
Total Lands	4.936	
Utility/Facility Relocations		
P.L. 91-646 Relocations		
Total Relocations		
	Lands Total	$42,800.00
	Lands Incremental Costs (20%)	$8,560.00
	Utility/Facility Relo Incremental Costs (25%)	$0.00
	Sponsor Administrative Costs	$100,000.00
Federal Administrative Costs	Total LERRD	$151,360.00
		$50,000.00
	Total Real Estate Costs	$201,360.00

11. RELOCATION ASSISTANCE BENEFITS (P.L. 91-646)

No relocations are anticipated for this project.

12. MINERAL/TIMBER ACTIVITY

No mineral or timber activity is anticipated.

13. SPONSOR CAPABILITY

The Non-Federal Sponsor for this project is the Great Lakes Fishery Commission (GLFC). The GLFC has previously worked with the Army Corps of Engineers in the State of Michigan to build multiple Sea Lamprey Barriers. The Non-Federal Sponsor has the authority to hold title, acquire land, and utilize eminent domain. However, the GLFC has indicated repeatedly that the GLFC

does not wish to utilize eminent domain for this project and also does not want other agencies or groups to utilize eminent domain on their behalf for this project. Because of this, there will be no path forward to acquire the land necessary to complete the project if any landowner within the project footprint does not willingly agree to sell the land necessary to construct the project.

In previous projects, the GLFC has not been willing to hold lands for the operation and maintenance of a project and relied on a local co-sponsor to acquire and hold the required lands. The USACE is currently having discussions with the PA Fish and Boat Commission about signing on to this project to complete these tasks. A Capability Assessment with the PA Fish and Boat Commission will be needed if the Commission agrees to sign on to the project following feasibility. The GLFC has been determined to be Marginally Capable in a Capability Assessment.

The GLFC has indicated in the capability assessment that they do not have the in-house capability to provide necessary services to acquire real estate for this project and may rely on the USACE or a contractor to provide such services. If USACE is asked to provide these services, then the USACE will have to review the project facts and make a determination about whether or not to provide such services. This process would involve sending a package to USACE HQ in order to get a formal determination. It should not be taken as a guarantee that if the GLFC asks the USACE to provide these services that the USACE will acquire the land or provide real estate services on GLFC's behalf.

A Sponsor Capability Assessment with GLFC has been completed for the Project and is identified as Exhibit B.

14. ZONING

No zoning issues are anticipated with this project.

15. SCHEDULE

Activity	Timeframe
Project Partnership Agreement Signed by NFS	Day 0
Real Estate Map Complete	PPA Agreement + 1 month
Notice to Acquire Sent To NFS	Real Estate Map + 6 weeks
NFS Begins Acquisition	Notice to Acquire + 2 weeks
Real Estate Acquisition Complete	NFS Begins Acquisition + 24 Months
Certification of Real Estate	Real Estate Acquisition Complete + 1 month
Construction Contract Ready To Advertise Date	Certification of Real Estate + 1 Week
Total	**28 months + 1 week**

16. UTILITY/FACILITY RELOCATIONS

ANY CONCLUSION OR CATEGORIZATION CONTAINED IN THIS REPORT THAT AN ITEM IS A UTILITY OR FACILITY RELOCATION TO BE PERFORMED BY THE NFS AS PART OF ITS LERRD RESPONSIBILITIES IS PRELIMINARY ONLY. THE GOVERNMENT WILL MAKE A FINAL DETERMINATION OF THE RELOCATIONS NECESSARY FOR THE CONSTRUCTION, OPERATION, OR MAINTENANCE OF THE PROJECT AFTER FURTHER ANALYSIS AND COMPLETION AND APPROVAL OF FINAL ATTORNEY'S OPINIONS OF COMPENSABILITY FOR EACH OF THE IMPACTED UTILITIES AND FACILITIES.

No utility or facility relocations are anticipated for this project.

17. ENVIRONMENTAL CONSIDERATIONS

The USACE Civil Works planning policy (ER 1165-2-132) requires early identification and appropriate consideration of hazardous, toxic, and radioactive waste (HTRW) problems during a feasibility study, and it broadly defines HTRW as any material listed as a "hazardous substance" under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). The intent of the policy is to prevent expenditure of Civil Works funds to clean up contamination caused by others and spells out procedures that parallel those used in the private sector to prevent potential liability under CERCLA.

It is anticipated that Conneaut Creek will have a low probability of having HTRW present given the area is rural with minimal development and no history of industry. A preliminary HTRW screening within the study area was conducted by reviewing the following resources; historic aerials, USEPA's Envirofacts (which includes records of Superfund sites, toxic releases, water discharges, air emissions, and hazardous wastes), and, Pennsylvania Department of Environmental Protection databases.

There are numerous conventional oil wells scattered throughout the entire study area, however, most of these wells are outside of the 100-year floodplain and the confines of the Conneaut Creek valley. There were no Superfund sites in the vicinity of the study area. Overall, the preliminary HTRW screening of the study area resulted in minor recognized environmental conditions (RECs) none of which would present obstacles to construction of a sea lamprey barrier within the study area. A Phase I HTRW investigation will be completed to ascertain the environmental history and current conditions of the location as it relates to HTRW. If the Phase I investigation indicates a likelihood of contamination, a Phase II HTRW investigation may also be required. A Phase II investigation would include collecting samples (e.g., sediment, soil, water) and chemical analysis to characterize the material. As the project site likely would be far from any past activities that could be associated with HTRW, it is not likely that a Phase II investigation would be recommended for this location.

18. PROJECT SUPPORT AND OWNER ATTITUDE/ISSUES

Landowner attitudes vary within the footprint. While most landowners have expressed support for the general mission of the study, support has varied across the proposed alternatives based on potential effectiveness and property impacts. A Landowner Meeting will be held at the appropriate time and there have been 2 Public Meetings where Real Estate issues have been discussed with impacted landowners. The completion of the project may be delayed or not successfully completed

if any individual landowners ultimately decide to not sell the required land needed for the project to the non-Federal Sponsor as the usage of condemnation is off the table.

19. SPONSOR NOTIFIED OF RISK OF ADVANCED ACQUISITION

The Great Lakes Fishery Commission (GLFC) has been notified about the risks of acquiring property before signing a Project Partnership Agreement. The GLFC received the Risk Letter on 21-April-2022.

20. OTHER RELEVANT REAL ESTATE ISSUES

Approximately 11.2 percent of the entire Conneaut Creek Watershed is covered by wetlands (i.e., 1,157.8 acres in Ohio and 12,616.2 acres in Pennsylvania). Exhibit C shows the wetlands identified in the USFWS National Wetland Inventory mapping for the Conneaut Creek watershed. There are 468 emergent wetlands totaling approximately 627.9 acres and 2,269 forested/scrub shrub wetland totaling 11,988.3 acres that are found in the upstream Pennsylvania portion of the watershed.

There are no cemeteries within the project area.

The Detroit District Real Estate Division will coordinate, monitor, and assist with all real estate activities undertaken by the non-Federal Sponsor. If any acquisition activities are required by the non-Federal Sponsor, the Real Estate Division will assure that the acquisition process is conducted in compliance with Federal and State Laws, specifically, the requirements under the Federal Uniform Relocation and Acquisition Act (P.L. 91-646). The Real Estate Division will attend district team meetings, and also review and provide input into draft and final reports prepared by the district team.

Prepared By:

_____
MICHAEL A. BUCKLEY
Realty Specialist
Buffalo, Chicago, & Detroit Districts

Approved By:

_____
MICHAEL B. ROHDE
Chief, Real Estate
Buffalo, Chicago, & Detroit Districts

EXHIBIT A
Project Map

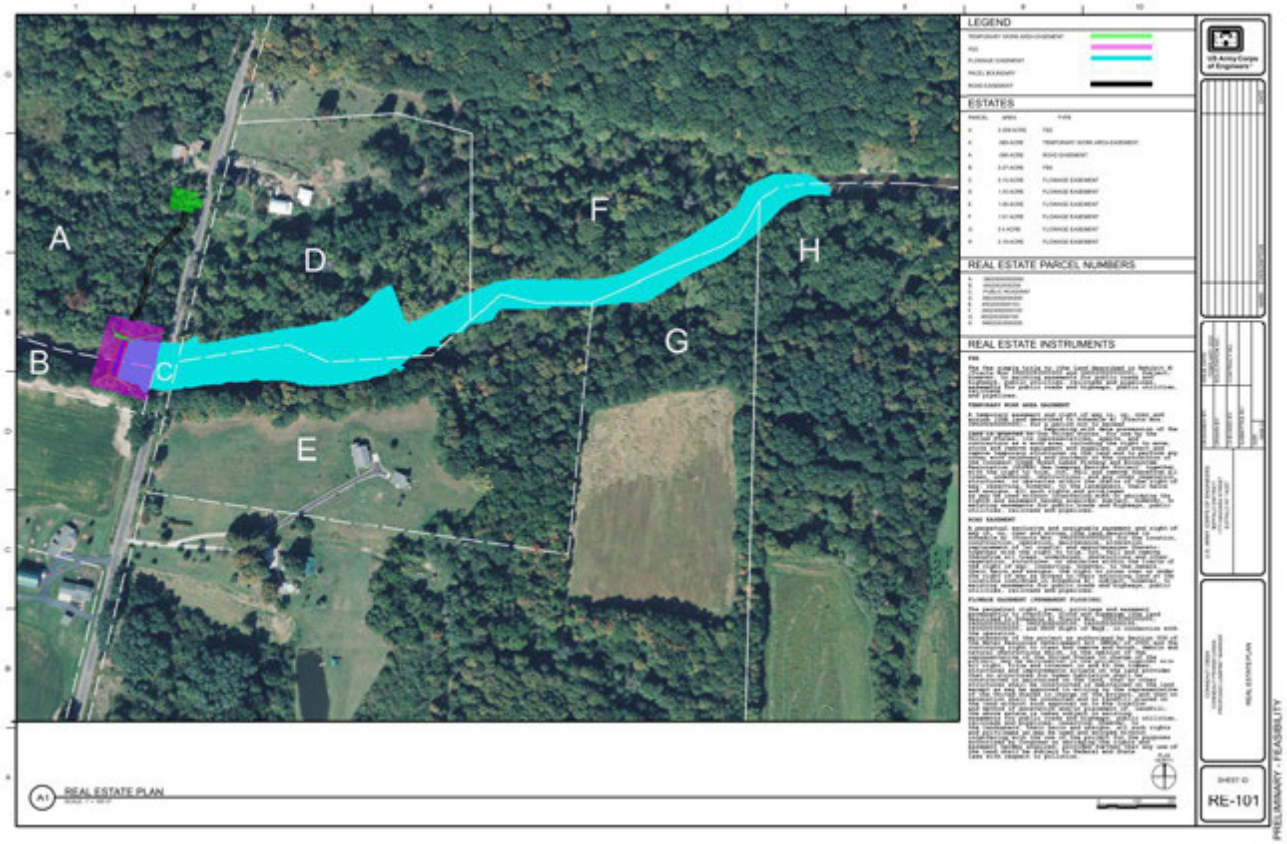


EXHIBIT B
Capability Assessment

Section 506 of the Water Resources Development Act (WRDA) of 2000, as amended by Section 5011 WRDA 2007 for the 495058 GLFER Conneaut Creek Sea Lamprey Barrier Project

ASSESSMENT OF NON-FEDERAL SPONSOR'S REAL ESTATE ACQUISITION CAPABILITY

Sponsor(s):

Great Lakes Fishery Commission

Authority:

Section 506 of the Water Resources Development Act (WRDA) of 2000, as amended by Section 5011 WRDA 2007, authorizes the USACE to develop a plan for activities that support the management of Great Lakes fisheries in cooperation with the signatures to the Joint Strategic Plan for Management of the Great Lakes Fisheries and other affected interests.

Non-Federal Sponsor Real Estate Contact:

Mr. Chris Freiburger
Sea Lamprey Program Manager
Great Lakes Fishery Commission
2200 Commonwealth Blvd., Suite 100
Ann Arbor, MI, 48105-2957

I. Legal Authority

a. **Does the non-Federal Sponsor have legal authority to acquire and hold title to real property for project purposes?**

Yes__X___No_____

Non-Federal Sponsor is authorized to acquire and own land by authority of Great Lakes Fishery Act of 1956 Section 6

b. **Does the non-Federal Sponsor have the power of eminent domain for this project?**

Yes__X___No_____

The use of eminent domain is authorized by
Great Lakes Fishery Act of 1956 Section 6

c. **Does the non-Federal Sponsor have "quick-take" authority for this project?**

Yes__X___No_____

Non-Federal Sponsor's "quick-take" authority is authorized by
Great Lakes Fishery Act of 1956 Section 6

d. **The non-Federal Sponsor has reviewed the project maps and confirmed that all of the lands/ interests in land required for the project are located inside of their political boundary.**

Yes__X___No_____

e. **Are any of the lands/ interests in land required for the project owned by an entity whose property the non-Federal Sponsor cannot condemn?**

Yes_____No__X___

f. **The non-Federal Sponsor was provided the Local Sponsors Toolkit on (Insert date of CA Meeting)**
http://www.lrd.usace.army.mil/Portals/73/docs/RealEstate/Non-Federal_Sponsor_Package.pdf

II. Financial Capability

a. **The non-Federal Sponsor has reviewed and concurs with the real estate cost estimates.**

Yes__X___No____

Note: No costs currently available. I explained that USACE will be providing real estate costs as part of the Real Estate Appendix in the Feasibility Study and that this information will be provided before PPA signing.

b. **It has been established by the responsible district element that the non-Federal Sponsor is financially capable of fulfilling all requirements identified in the Project Partnership Agreement (PPA).**

Yes__X___No_____

III. Willingness To Participate

a. **The non-Federal Sponsor has stated in writing its general willingness to participate in the project and its understanding of the general scope of the project and its part of the project.**

Yes__X__

Letter of Intent from the NFS dated: October 29, 2020

b. **The non-Federal Sponsor is agreeable to signing a project partnership agreement and supplying funding as stipulated in the agreement.**

Yes__X__

c. **The non-Federal Sponsor understands that it may be necessary to utilize eminent domain authority in order to acquire lands required for this project.**

Yes____ No__X___

Note: Great Lakes Fishery Commission has been clear that they do not intend on utilizing Eminent Domain for the purposes of this project. Great Lakes Fishery Commission also does not wish to have future project partners or USACE utilize eminent domain to complete this project on their behalf.

IV. Acquisition Experience and Capability

a. **Taking into consideration the project schedule and complexity, the non-Federal Sponsor has the capability with in-house staffing or contract capability, to provide the necessary services such as surveying, appraising, title, negotiating, condemnation, closings, and relocation assistance that will be required for the acquisition of properties for this project.**

Yes_____No__X__

Note: Sponsor anticipates seeking USACE or contractor support.

b. **The non-Federal Sponsor's staff is familiar with the real estate requirements of Federal projects including P.L. 91-646, as amended.**
Yes__X__No_____

c. **The non-Federal Sponsor can obtain contractor support and meet project schedules.**

Yes_____No__X___

Note: Sponsor anticipates seeking USACE or contractor support.

d. **The non-Federal Sponsor's staff is located within a reasonable proximity to the project site.**

Yes__X___No_____

e. **Will USACE assistance likely be requested by the non-Federal Sponsor in acquiring real estate?**

Yes__X___No_____

Note: Sponsor anticipates requesting USACE assistance in acquiring Real Estate

V. Schedule Capability

The non-Federal Sponsor has approved the tentative project/ real estate schedule/ milestones and has indicated its willingness and ability to incorporate its financial, acquisition, and condemnation capability to provide the necessary project LERRDs in accordance with proposed project schedules so the Government can advertise and award the construction contract as required by overall project schedules and funding limitations.

Yes___X___ Initials: CEF Date 08/29/22

Note: Full schedule anticipated with Feasibility Study due in January, 2023. Sponsor will have time to review schedule prior to signing PPA.

VI. LERRD Credits

The sponsor has indicated its understanding of LERRD credits and its capability and willingness to gather the necessary information to submit as

PROJECT NAME AND AUTHORITY

LERRD credits in within six months after possession of all real estate and completion of relocations in order that the project can be financially closed and there can be a final financial accounting with a proper settlement with the non-Federal Sponsor.

Yes___X___ Initials: CEF Date: 08/29/22

VII. Capability

With regard to this project, the non-Federal Sponsor is anticipated to be:

Marginally Capable

a. Fully Capable: *Previous experience. Financially capable. Authority to hold title. Can perform, with in house staff, the necessary services (survey, appraisal, title, negotiation, closing, relocation assistance, condemnation & "quick-take" authority) required to provide LERRD.*

b. Moderately Capable: *Financially capable. Authority to hold title. Can provide, with contractor support, the necessary services (survey, appraisal, title, negotiation, closing, relocation assistance and condemnation authority) required to provide LERRD. Quick-take authority will be provided by:*

c. **Marginally Capable:** *Financially capable. Authority to hold title. Will rely on approved contractors to provide the necessary services (survey, appraisal, title, negotiation, closing, and relocation assistance). Quick-take authority and authority to condemn will be provided by USACE or Contractor Support.*

d. Insufficiently Capable: *Financially capable. Will rely on approved contractors to provide the necessary services (survey, appraisal, title, negotiation, closing, and relocation assistance). Quick-take authority and authority to condemn will be provided by* _____.
Will rely on _____ *to hold title.*

VIII. Coordination

This assessment has been coordinated with the non-Federal Sponsor and it concurs with the assessment.

Yes__X___

This assessment has been coordinated with:

Name: Chris E Freiburger

Title: Sea Lamprey Program Manager

Prepared by:

Michael Buckley

Michael Buckley, Realty Specialist

Considering the capability of the non-Federal Sponsor and the ancillary support to be provided by _____, and identified above, it is my opinion that the risks associated with LERRD acquisition and closeout have been properly identified and appropriately mitigated.

M R Rohde

Digitally signed by ROHDE.MICHAEL.B.1387945357
Date: 2022.09.21 10:21:26 -05'00'

Michael Rohde
Chief, Real Estate Division
Great Lakes Region

Non-Federal Sponsor Representative:

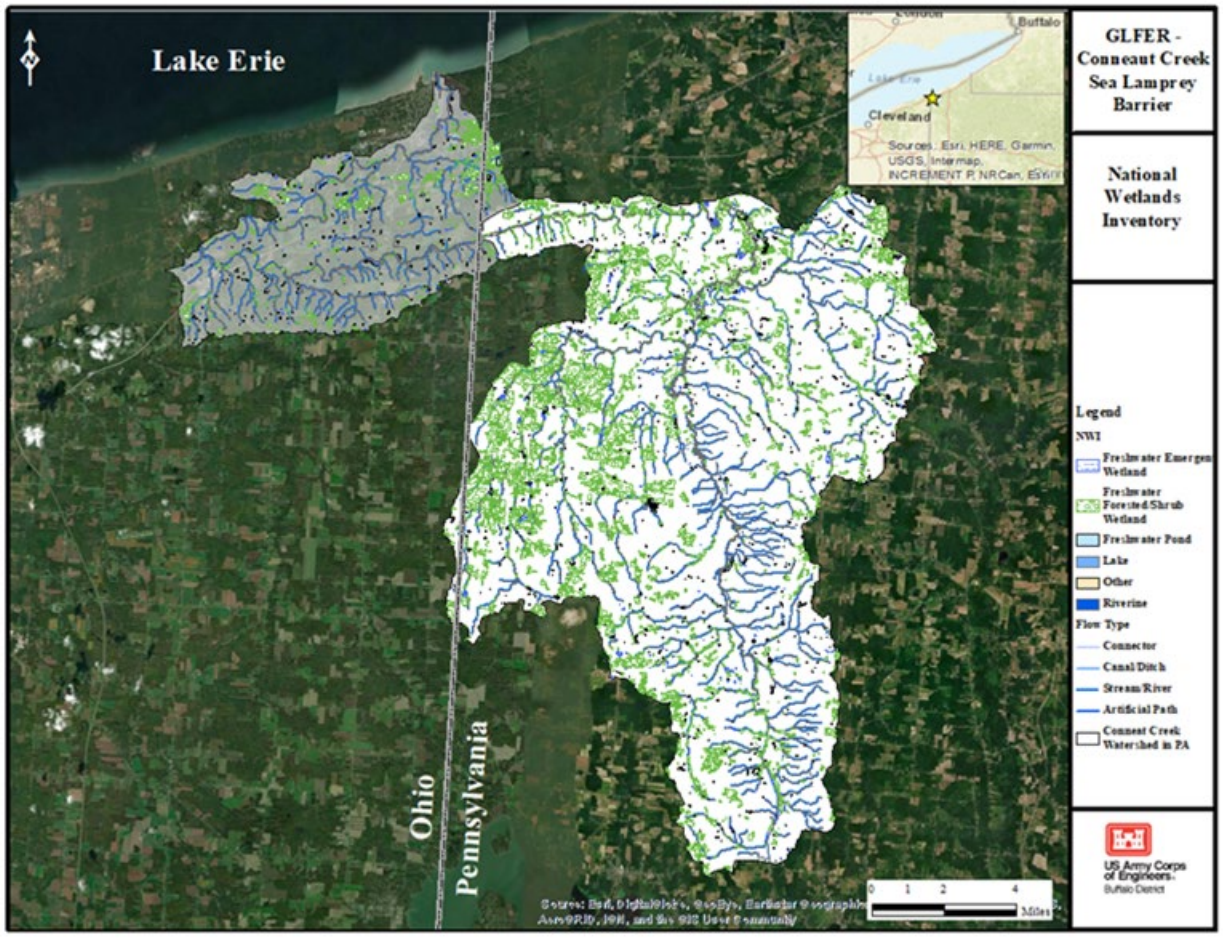
Signature: Chris E Freiburger

Name: Chris E Freiburger

Title: Sea Lamprey Program Manager

Date: 08 / 29 / 22

Exhibit C
Wetland Map



US Army Corps of Engineers®
Buffalo District

CONNEAUT CREEK SEA LAMPREY BARRIER PROJECT
P2# 495058

Section 506 – Water Resources Development Act of 1992, as amended Great Lakes Fishery and Ecosystem Restoration

Erie County, Pennsylvania

Appendix A-9:
Economic & Cost Effectiveness/Incremental Cost Analysis

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GLFER Conneaut Creek: Incremental Cost Analysis

1. Introduction

The purpose of the report is to present the Cost Effectiveness and Incremental Cost Analysis (CE/ICA) in support of the GLFER Conneaut Creek Study. According to Engineering Regulation (ER) 1105-2-100, Section 2-3 f(2), "For ecosystem restoration projects, a plan that reasonably maximizes ecosystem restoration benefits compared to costs, consistent with the Federal object, shall be selected. The selected plan must be shown to be cost-effective and justified to achieve the desired level of output. This plan shall be identified as the National Ecosystem Restoration (NER) Plan."

On 05, January 2021, the Assistant Secretary of the Army (Civil Works) (ASA(CW)) released a memorandum requiring all civil works projects evaluate all four economic benefit categories consistent with the Economic and Environmental Principles and Guidelines of 1983 and identify, at a minimum, the following plans in the final array of alternatives for evaluation:

1. The "No Action" alternative.
2. A plan that maximizes net total benefits across all benefit categories.
3. A plan that maximizes net benefits consistent with the study purpose.
4. For flood-risk management studies, a nonstructural plan, which includes modified floodplain management practices, elevation, relocation, buyout/acquisition, dry flood proofing and wet flood proofing.
5. A locally preferred plan, if requested by a non-federal partner, if not one of the aforementioned plans.

While plan selection is still primarily determined using the NER Plan for ecosystem restoration planning, the National Economic Development (NED), Regional Economic Development (RED), Other Social Effects (OSE), and Environmental Quality (EQ) benefits are still evaluated. CE/ICA helps determine the NER Plan since traditional benefit-cost analysis is typically not possible because costs and benefits are expressed in different units. Cost effectiveness is conducted to ensure that the least cost plans are identified for each possible level of ecosystem restoration output; and for any level of investment, the maximum level of output is identified. Incremental cost analysis is used to compare the additional cost for each additional output of an alternative. ER 1105-2-100, Section 3-5 c(2) states, "[Incremental cost analysis] is a tool that can assist in the plan formulation and evaluation process, rather than a dictum that drives that process. Incremental analysis helps to identify and display variations in costs among different increments of restoration measures and alternative plans. Thus, it helps decision makers determine the most desirable level of output relative to costs and other decision criteria."

In the absence of a common measurement unit for comparing the non-monetary ecosystem restoration benefits with the monetary costs of ecosystem restoration plans, CE/ICA are valuable tools to assist in decision-making. The results of the analyses permit decision-makers to progressively compare alternative levels of ecosystem restoration outputs.

Although CE/ICA will not, like traditional benefit-cost analyses, lead to a single solution, the dual analysis assists in making well informed decisions.

CE/ICA follows methodologies established in the ER 1105-2-100, E-36, which outlines two tasks used to determine the cost effectiveness of each plan under study. The first task pertains to the formulation of combinations of management measures or alternative plans. It entails reviewing management measures and alternatives to separate those that can be implemented together from those that cannot be implemented together, listing all combinations of the combinable management measures or alternative plans and displaying each plan's ecosystem output and cost estimate. The second task pertains to CE/ICA. It entails identifying and eliminating inefficient and ineffective plans to determine which plans are cost effective. The IWR Planning Suite software was used to assist with this formulation and comparison of plans.

1.1. Study Area

Conneaut Creek originates in northwestern Pennsylvania and flows north for approximately 35 miles where it then turns west for 26 miles. After crossing the Ohio – Pennsylvania border, the creek turns east-northeast flowing for 13 miles before it drains into Lake Erie. The entire drainage basin for Conneaut Creek is 190.7 square miles (mi2). Figure 1 illustrates the extent of the Conneaut Creek watershed in Ohio and Pennsylvania. The study area for this project is the mainstem of Conneaut Creek in Pennsylvania between the Ohio-Pennsylvania border at river mile (39.1) and the confluence of the East Branch of Conneaut Creek at RM 54.6. This part of northwestern Pennsylvania is located within Congressional District PA-16, represented by U.S. Representative Mike Kelly, and U.S. Senators Robert Casey and John Fetterman.

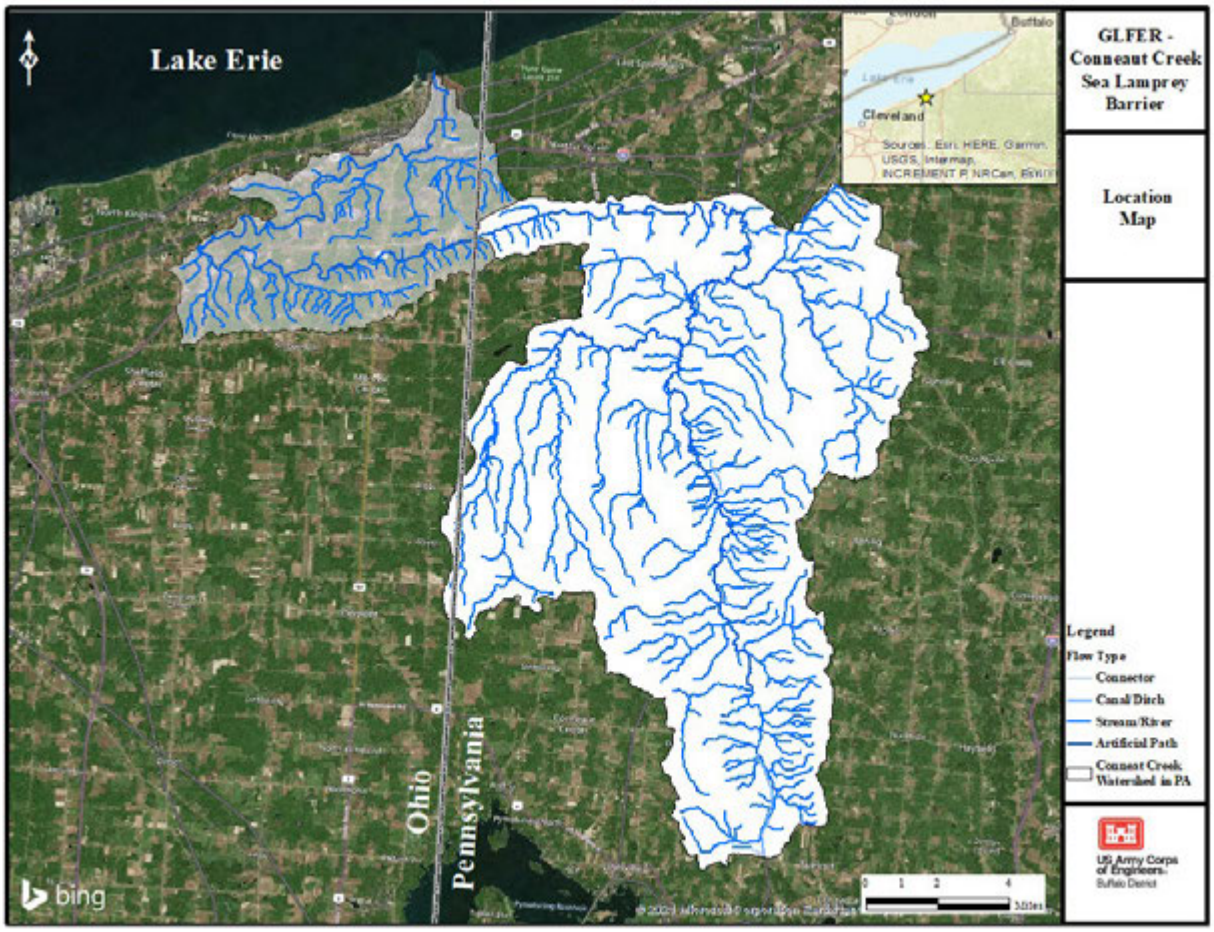

Figure 1-1: Conneaut Creek watershed located in northeastern Pennsylvania and northwestern Ohio.

1.2. Assumptions

- Economic analysis assumes a 50 year period of analysis, starting in 2025.
- Economic Guidance Memorandum (EGM) 24-01 requires costs to be amortized at the FY 2024 Federal discount rate of 2.75 percent and presented in FY 2024 dollars.
- The outputs quantified in the CE/ICA are defined as the quantification of expected effects in target functions as related to the project objectives.

2. CE/ICA Methodology

This evaluation is conducted using CE/ICA to identify the cost effective and best buy alternatives. The process begins with the identification of potential project measures. Each project measure is identified as an alternative and then evaluated in terms of costs and environmental benefits. A screening of measures was conducted prior to the creation of the proposed alternatives. Each alternative is a combination of the screened measures. Therefore, each alternative is considered a separable element and was not combined with other alternatives.

The evaluation proceeds by calculation of environmental restoration outputs (as represented by

Habitat Units) and costs for each alternative. After calculating outputs and costs for each alternative, IWR Planning Suite identifies alternatives as non-cost effective, cost effective, or best buy. A non-cost effective alternative is one that produces the same or lower output as another alternative, but at a higher cost; or produces a lower output than another alternative at the same cost. This process is referred to as cost effectiveness analysis.

For alternatives designated as cost effective, the average cost per unit of output is calculated. The alternatives are then ordered in terms of increasing output and the average costs are reviewed. Alternatives providing levels of output less than the lowest average cost level are dropped from further analysis. For the remaining alternatives, average cost for additional output is then recalculated, using the lowest average cost alternative. The remaining alternatives are again ordered in terms of lowest average cost. The alternative with the lowest average cost for additional output is identified and alternatives with lower outputs are again eliminated from further consideration. This recalculation process is repeated until none of the remaining alternatives can be eliminated from further consideration.

To determine which of the cost effective alternatives are "best buy" alternatives, an iterative analysis is conducted that calculates average costs, identifies an alternative with the lowest average cost, eliminates alternatives with levels of output less than this alternative and advances levels of output greater than the lowest average level of output to the next step.

2.1. Ecosystem Restoration Alternatives

Management measures are defined as the building blocks of alternatives to meet the planning objectives. These measures are formulated into alternatives that address the objectives. Table 1 shows the proposed restoration management alternatives for the GLFER Conneaut Creek Study.

Table 1: Conneaut Creek Final Array of Alternatives

Alternatives	Barrier Measures		Passage Measures			
	Primary	Secondary	Primary	Secondary	Tertiary	Recreation
No Action						
1	Fixed Crest – High		Trap & Sort	Denil Fishway		Portage
2	Electric		Trap & Sort			Portage
3a	Fixed Crest – Low	Electric	Trap & Sort	Slotted Fishway	Jumping Pool	Portage
4a	Adjustable Crest – Low (Obermeyer)	Electric	Trap & Sort	Jumping Pool		Portage

2.2. Formulation of Outputs

To calculate the ecological uplift derived from each alternative plan, aquatic resources within the Project Area were delineated. Then, the initial quality of the affected environment was assessed using the Ohio Environmental Protection Agency (OEPA) Ohio Rapid Assessment Methodology (ORAM) for wetlands (OEPA 2001) or the US EPA Rapid Bioassessment Protocol (RBP) – Habitat Assessment for streams (US EPA 1999). Additional information regarding the ORAM and RBP is provided in Appendix A-6.

Calculation of ecological outputs needed to consider both the habitat area protected by the barrier as well as the area of habitat adversely impacted by each type of barrier. The HUs will be used to determine the cost per HU for restoration features. They will be averaged over the project period of 50 years and used in IWR Planning Suite II version 2.0.9.1 to designate the cost effective and best buy ecosystem restoration alternatives. Given the average annual cost and average annual HUs of each alternative, the IWR Planning Suite software generates the CE/ICA outputs. The results were used on the final array of alternatives to determine the best buy alternatives, which is used in choosing the tentatively selected plan (TSP).

Table 2 shows the calculation of benefits based on the environment models detailed in the Formulation of Outputs. Benefits are measured in terms of Average Annual Habitat Units (AAHU). AAHUs reflect the change between the Future With and Without Project Conditions. As a result, AAHUs will be zero under the no action alternative.

Table 2: Calculations of Habitat Units

Alternatives	**$HU_{Protected}$**	**Barrier Effectiveness**	**$HU_{Impacted}$**	**AAHU**	**Δ AAHU**
No Action – Continued lampricide treatment	371.0	0.90	41.4	292.5	0.0
1 – Fixed crest (High), Trap & Sort, Denil	513.0	0.99	319.7	189.2	-103.2
2 – Electric, Trap & Sort	513.0	0.75	25.7	358.4	66.0
3a – Fixed Crest (Low), Electric, Trap & Sort, Slotted Fishway, Jumping Pool	513.0	0.95	58.5	427.5	135.0
4a – Adjustable Crest (Low – Obermeyer), Electric, Trap & Sort, Jumping Pool	513.0	0.95	33.3	452.4	160.0

2.3. Project Cost

The costs used for the comparison of alternatives are rough order of magnitude (ROM) costs. A more detailed cost estimate for the recommend plan is shown in The Recommended Plan section.

The first cost plus interest during construction (IDC) equals the total investment cost. The construction time used for calculating IDC is 1 year. IDC was calculated using the IWR Planning Suite Annualizer Tool.

The total investment cost is amortized at the fiscal year (FY) 2023 Federal discount rate of 2.5 percent over a 50-year economic period of analysis to calculate the average annual cost (AAC).

For each component, the ROM costs, interest during construction (IDC), and Total Average annual cost (AAC) are presented in Table 3. A detailed breakdown of the first costs for the recommended plan can be found in Appendix H: Cost Appendix. Costs are presented in FY23 dollars and interest rate of 2.5% over a 50 year economic period of analysis.

Table 3: Cost of Alternatives

Alternative	ROM Cost	IDC	AAC
No Action - continued lampricide treatment	-	-	-
1 - Fixed Crest (High), Trap & Sort, Denil	$6,484,300	$6,754	$228,862
2 - Electric, Trap & Sort	$3,740,867	$3,897	$132,033
3a - Fixed Crest (Low), Electric, Trap & Sort, Slotted Fishway, Jumping Pool	$5,332,427	$5,555	$188,207
4a - Adjustable Crest (Low - Obermeyer), Electric, Trap and Sort, Jumping Pool	$6,076,071	$6,329	$214,454

3. Project Benefits

Average annual habitat units represent the quality of habitat provided by an area over the course of one year. Taking into account the successional trajectories, habitat units were calculated annually for each alternative for the first 50 years after the implementation of restoration alternatives. Average annual habitat units (AAHU) were then calculated by averaging the annual habitat units for the 50 year life of the project. Table 4 is a summary of the average annual cost of each alternative and the average annual output associated with that alternative and Figure 2 displays the comparison of the alternatives' costs and output using IWR Planning Suite.

Table 4: Summary of Costs and Outputs by Alternative

Alternative	ROM Cost	AAC	Δ AAHU	Cost/Output	Cost Effective
No Action	-	-	0.0	-	Best Buy
1	$6,484,300	$228,862	-103.2	($2,108)	Non-Cost Effective
2	$3,740,867	$132,033	66.0	$1,902	Cost Effective
3a	$5,332,427	$188,207	135.0	$1,325	Cost Effective
4a	$6,076,071	$214,454	160.0	$1,274	Best Buy

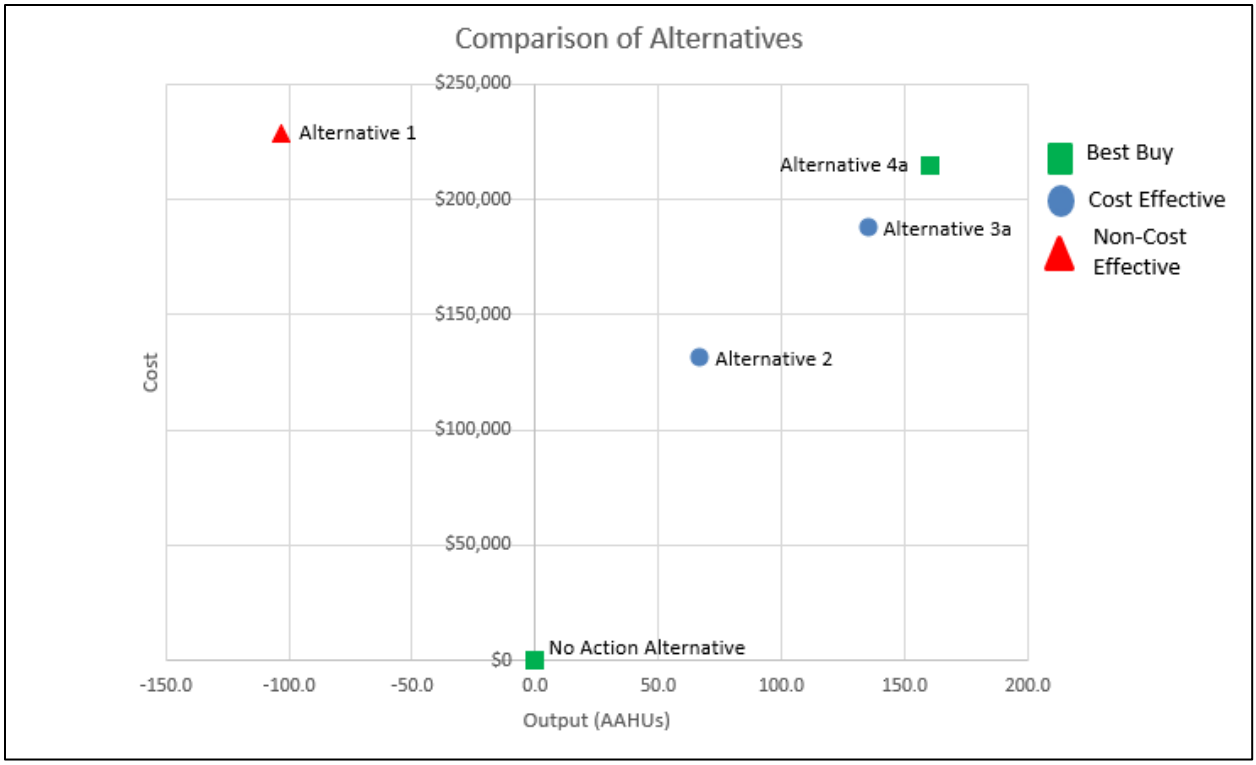

Figure 3-1: Comparison of Alternatives

The cost effective alternatives are compared to the most economically efficient alternatives. In other words, the "Best Buy" alternative produces the "biggest bang for the buck". As shown in Table 5, the Best Buy plans are No Action Alternative and Alternative 4a.

Table 5: Incremental Costs of Best Buy Alternatives

Measure	***AAC***	***AAHU***	***Incremental AAC per AAHU***
No Action	$0	0	0
Alternative 4a	$214,454	160	$1,340

What is being measured to determine the best buy plan is the additional AAC for each additional AAHU between alternatives ranked in ascending order of output. To determine which "best buy" alternative to select, it must be determined whether or not the additional cost of the next alternative is worth its additional output. Figure 3 is a display of best buy plans showing the incremental AAC and AAHU output for each plan.

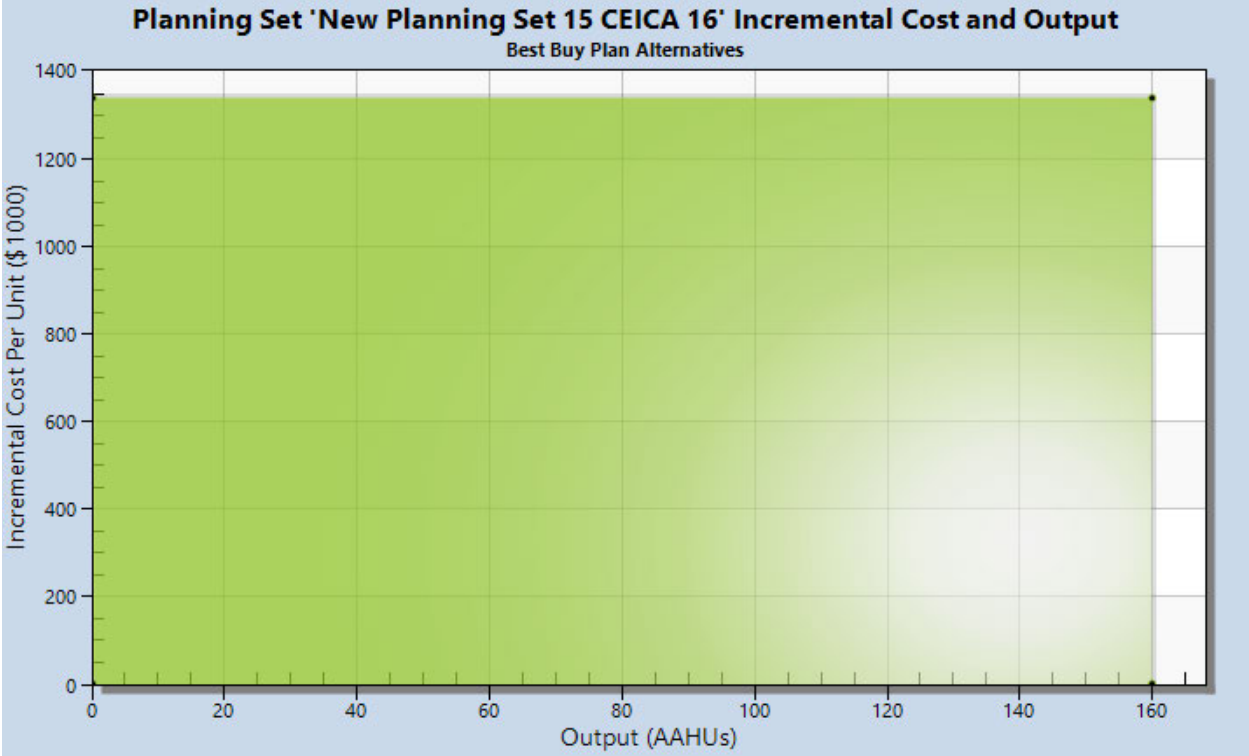

Figure 3-2: Incremental Cost of Best Buy Alternatives

4. Comprehensive Benefit Evaluation

Based on the January 5, 2021 ASA(CW) memorandum, planning studies must, "identify and analyze benefits in total and equally across the full array of benefit categories." While the four benefit accounts must be evaluated for studies, project justification can still rely on the NED or NER analysis.

4.1. NED Evaluation

Under the without-project conditions, the U.S. Fish and Wildlife Services (USFWS) will continue to conduct lampricide treatments every 3-5 years at a cost of $192,000. The USFWS indicated that the Bessemer Dam on the East Branch Conneaut Creek is deteriorating and may need to conduct lampricide treatments in the East Branch within 20 years for an additional $85,000. Under the with-project conditions, the lampricide treatments in Conneaut Creek will no longer be necessary, resulting in an average annual NED benefit of $59,100.

4.2. RED Evaluation

The USACE Regional Economic System (RECONS) model was used to conduct the Regional Economic Development (RED) evaluation for the focused array of alternatives. RECONS is a USACE-certified regional economic model designed to provide accurate and defensible estimates of regional economic impacts and contributions associated with USACE projects, programs, and infrastructure. Regional economic impacts and contributions are measured as economic output (sales), jobs, income, and value added. Estimates are provided simultaneously for three levels of geographic impact area: local, state, and national.

Table 6 and Table 7 display key terms and definitions to assist with interpreting the results of this RED evaluation.

Table 6: Overview of Economic Impact Metrics

Output (sales)	Annual sales are equivalent to annual economic output or the value of production by industry. Output can be measured either by total value of purchases by intermediate and final consumers or by intermediate outlays plus value added.
Jobs	A job is the annual average of monthly jobs in an industry (this is the same definition used by Quarterly Census of Employment and Wages, Bureau of Labor Statistics, and Bureau of Economic Analysis nationally). A job can be full-time, part-time or overtime, and includes proprietors (i.e., self-employed persons). Job estimates are presented in full-time equivalence.
Labor Income	Labor income represents all forms of annual employment earnings; it is the sum of employee compensation and proprietor income.
Value Added	Value added consists of employee compensation, proprietary income, other property type income (which includes industry profits), and indirect business taxes. Value-added is an estimate of the gross regional product (GRP).

Table 7: Overview of Economic Impacts

Direct Impacts	Direct impacts occur in the impact area in which a project or economic activity is located. Direct sales represent that proportion of the spending or sales in each industry that flows to material and service providers in the impact area. For employment, labor income, and GRP measures, the direct impacts represent the jobs, labor income, and gross regional product associated with the directly affected industry.
Indirect Impacts	The indirect impacts include the backward-linked industry suppliers for goods and services that support the directly affected industries, supporting indirect sales, jobs, labor income and value added. For example, if construction activity is the direct impact, indirect business supporting construction would include architectural and engineering, lumber suppliers, trucking, and steel manufacturers, among others; these are considered backward-linked industries supporting the construction activity.
Induced Impacts	Induced impacts occur from household expenditures or consumer spending associated with the direct and indirect workers spending their earnings within the impact area, supporting induced sales, jobs, labor income, and value added.
Total Impacts	Total impacts are the sum of direct, indirect, and induced impacts.

The RECONS module applied in this evaluation was the *Civil Works Spending: All Work Activities, with Ability to Customize Impact Area and Work Activity*, with the *Construction Activities for Ecosystem and Habitat Restoration or Improvements* work activity, and a local impact area of Erie County, Pennsylvania. Figure 4-1 shows the impact area of Erie County within the state of Pennsylvania.

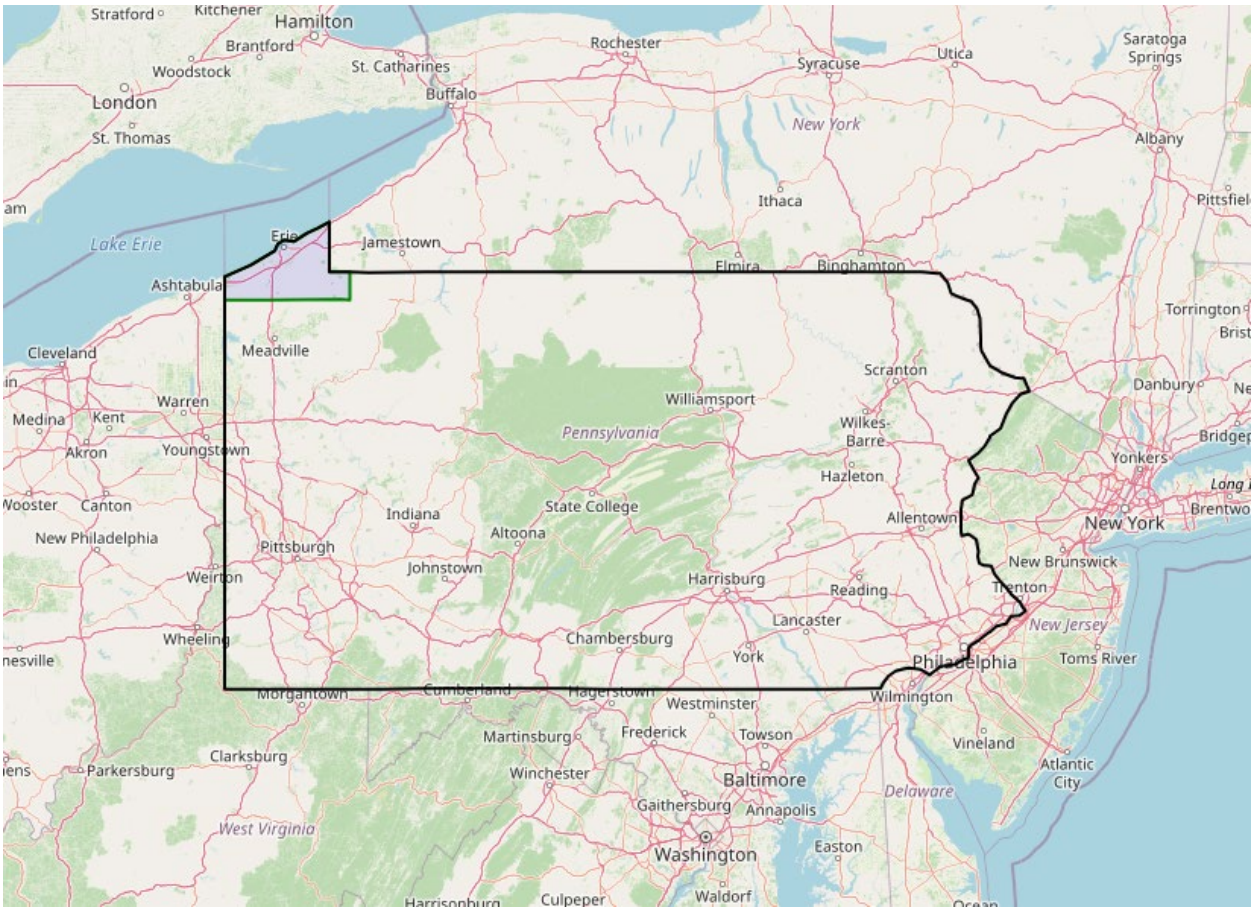

Figure 4-1: Regional Impact Area (Erie County, Pennsylvania)

The Civil Works Spending Modules are used to estimate the regional economic impacts and contributions of project expenditures within the eight USACE Civil Works business lines. Project expenditures include studies, construction, and operations and maintenance activities. The Civil Works Spending Modules allow the user to specify the project location and work activity (e.g., dredging, lock and dam construction, beach nourishment, etc.) to estimate the economic output, jobs, income, and value added for three levels of geography: local, state, and national impact areas.

Construction expenditures associated with the alternatives were entered into the model to generate output displayed in Table 8, Table 9, Table 10, and Table 11. Project expenditures and RED output are presented in FY23 dollars.

Table 8: Alternative 1 RED Activity Supported by Annual Construction Expenditure

Area Type	Economic Impact Metric			
	Output	Jobs[1]	Labor Income	Value Added
Local Area				
Direct Impact	$5,545,315	69.0	$3,928,683	$2,809,348
Indirect and Induced Impact	$4,455,517	29.5	$1,454,743	$2,421,821
Total Impact	$10,000,832	98.5	$5,383,426	$5,231,170
State				
Direct Impact	$6,338,662	84.6	$5,280,858	$3,718,776
Secondary Impact	$7,861,828	41.2	$2,725,280	$4,511,532
Total Impact	$14,200,490	125.8	$8,006,138	$8,230,309
U.S.				
Direct Impact	$6,481,087	87.9	$5,530,146	$3,898,493
Secondary Impact	$14,214,502	64.6	$4,413,574	$7,655,705
Total Impact	$20,695,589	152.5	$9,943,720	$11,554,198

[1] Full Time Equivalent Jobs.

Table 9: Alternative 2 RED Activity Supported by Annual Construction Expenditure

Area Type	Economic Impact Metric			
	Output	Jobs[1]	Labor Income	Value Added
Local Area				
Direct Impact	$3,199,156	39.8	$2,266,502	$1,620,745
Indirect and Induced Impact	$2,570,439	17.0	$839,258	$1,397,176
Total Impact	$5,769,595	56.8	$3,105,760	$3,017,922
State				
Direct Impact	$3,656,847	48.8	$3,046,587	$2,145,405
Secondary Impact	$4,535,579	23.8	$1,572,245	$2,602,755
Total Impact	$8,192,425	72.6	$4,618,833	$4,748,159
U.S.				
Direct Impact	$3,739,013	50.7	$3,190,405	$2,249,085
Secondary Impact	$8,200,509	37.3	$2,546,242	$4,416,664
Total Impact	$11,939,522	88.0	$5,736,646	$6,665,749

[1] Full Time Equivalent Jobs.

Table 10: Alternative 3a RED Activity Supported by Annual Construction Expenditure

Area Type	Economic Impact Metric			
	Output	Jobs[1]	Labor Income	Value Added
Local Area				
Direct Impact	$4,560,244	56.8	$3,230,790	$2,310,295
Indirect and Induced Impact	$3,664,038	24.2	$1,196,322	$1,991,608
Total Impact	$8,224,282	81.0	$4,427,113	$4,301,903
State				
Direct Impact	$5,212,660	69.6	$4,342,765	$3,058,172
Secondary Impact	$6,465,251	33.9	$2,241,160	$3,710,102
Total Impact	$11,677,911	103.4	$6,583,925	$6,768,274
U.S.				
Direct Impact	$5,329,785	72.3	$4,547,769	$3,205,963
Secondary Impact	$11,689,433	53.1	$3,629,546	$6,295,744
Total Impact	$17,019,218	125.4	$8,177,315	$9,501,707

[1] Full Time Equivalent Jobs.

Table 11: Alternative 4a RED Activity Supported by Annual Construction Expenditure

Area Type	Economic Impact Metric			
	Output	Jobs[1]	Labor Income	Value Added
Local Area				
Direct Impact	$5,196,201	64.7	$3,681,346	$2,632,482
Indirect and Induced Impact	$4,175,014	27.6	$1,363,158	$2,269,352
Total Impact	$9,371,215	92.3	$5,044,504	$4,901,833
State				
Direct Impact	$5,939,602	79.3	$4,948,393	$3,484,655
Secondary Impact	$7,366,875	38.6	$2,553,706	$4,227,502
Total Impact	$13,306,477	117.9	$7,502,099	$7,712,157
U.S.				
Direct Impact	$6,073,060	82.4	$5,181,987	$3,653,057
Secondary Impact	$13,319,606	60.5	$4,135,711	$7,173,729
Total Impact	$19,392,666	142.9	$9,317,698	$10,826,786

[1] Full Time Equivalent Jobs.

4.3. EQ Evaluation

The Economic and Environmental Principles and Guidelines of 1983 identifies the EQ account as, “non-monetary effects on significant natural and cultural resources.” Based on that definition, the EQ account is typically synonymous with the NEPA evaluation. As a result, please refer to the NEPA appendix for more information.

4.4. OSE Evaluation

In Executive Order 14008, President Biden directed the Council on Environmental Quality to develop a tool to identify disadvantaged communities. The Climate and Economic Justice Screening Tool Version 1.0, which was released on 22 November 2022, uses data from the U.S. Census Bureau to identify communities that are marginalized, underserved, and overburdened by pollution. Based on the tool, the census tracts that include and surround the study location are not identified as disadvantaged. Additionally, there are no other significant OSE impacts from this study.

4.5. Summary

The results from the four benefits accounts indicate that there are no significant benefits using a comprehensive benefit analysis. As a result, it is recommended that the alternative selection is determined using NER benefits and a CE/ICA. Therefore, alternative 4a is the recommended plan.

5. The Recommended Plan

Alternative 4a was selected as the recommended plan because it is a best buy plan that provides the lowest cost per AAHU. The estimated contractors earnings and contingencies costs have been developed using the USACE Micro-Computer Aided Cost Estimating System (MCACES). Engineering and design, supervision and administration and Land and Damages were calculated and added to the contractors earnings and contingencies. These values are based on FY24 price levels, a federal discount rate of 2.75 percent and a 50-year period of analysis. These costs, along with total annual ecosystem outputs, are shown in Table 7 below for the recommended plan.

Table 12: Economic Summary of the Recommended Plan (2024 Price Levels)

I. Project Costs	**Alternative 4a**
a. Project First cost	
1. Contractors Earnings + Contingencies	$6,678,000
2. Engineering and Design	$1,445,000
3. Supervision and Administration	$646,000
4. Lands and Damages	$241,000
Total First Cost	$9,010,000
b. Investment Costs	
1. Total First Costs (Incremental Costs)	$9,010,000
2. Interest During Construction	$123,888
3. Total Investment Costs	$9,133,888
c. Average Annual Costs	
Average Annual Investment Costs	$338,328

OMRR&R	$90,100
d. Total Average Annual Costs	$428,428
II. Benefits	
a. Ecosystem Restoration Benefits (AAHU)	160
b. Average Cost per Unit of Habitat	$2,678

Cost Apportionment

Under Section 506 authority, the non-federal sponsor is responsible for 35 percent of the design and construction costs, as well as 35 percent of feasibility costs beyond the first $100,000. Additionally, EP 1165-2-502 provides guidance indicating that recreational features are cost shared 50 percent federal and 50 percent non-federal. The apportionment of the federal and non-federal costs is presented below for the project. As shown in Table 8, the non-federal sponsor would be responsible for providing a total of approximately $3,684,000 in cash and/or work-in-kind and real estate.

Table 13: Determination of non-federal cost share

	FY21-FY24	FY25	FY26	FY27	Total
Planning Study					
Feasibility Study	$900,000				$900,000
Design & Implementation					
Design		$1,582,000			$1,582,000
Implementation Ecosystem			$6,745,000	$1,115,000	$7,860,000
Implementation Recreation			$11,000	$11,000	$22,000
LERRDs		$251,000			$251,000
Total Project Cost	$900,000	$1,833,000	$6,756,000	$1,126,000	$10,615,000
Fed / Non-Fed Breakdown					
Fed share	$620,000	$1,191,450	$4,389,750	$730,250	$6,931,000
Non Fed Cash / WIK	$280,000	$641,550	$2,366,250	$395,750	$3,684,000

US Army Corps of Engineers®
Buffalo District

CONNEAUT CREEK SEA LAMPREY BARRIER PROJECT
P2# 495058

Section 506 – Water Resources Development Act of 1992, as amended Great Lakes Fishery and Ecosystem Restoration

Erie County, Pennsylvania

Appendix A-10:
Letter of Intent

Great Lakes Fishery Commission

08 August 2023

Lieutenant Colonel Colby K. Krug
Adams District Commander
U.S. Army Corps of Engineers, Buffalo District
1776 Niagara Street, Buffalo, NY 14207-3199

Dear Colonel Krug:

In accordance with the provisions of the Great Lakes Fishery and Ecosystem Restoration Program (GLFER), the Great Lakes Fishery Commission (Commission) requests assistance of the U.S Army Corps of Engineers (Corps) with development of a sea lamprey barrier project on Conneaut Creek. As part of the project, the Commission requests that the Corps investigate the possibility of preparing a feasibility study under its GLFER Authority, Section 506 of the Water Resources Development Act of 1996, as amended, to formulate a restoration plan for the general area of the creek in question.

The Commission believes this project will support restoration of the Great Lakes fishery and enhance economic effectiveness of the sea lamprey control program by reducing the number of stream miles requiring treatment and the amount of lampricide required within Conneaut Creek. It is understood that the study would investigate multiple options for restoring and creating aquatic and ecologically significant habitats within the area of the project. The Commission would ensure that funds will be available to meet its cost sharing requirements to enable the Corps to advertise a construction contract.

The Commission understands that the feasibility phase of the project would be federally funded up to $100,000. Furthermore, the Commission understands that the cost-share arrangement above the initial feasibility cost of $100,000 would be funded 65% federal and 35% local and that there is a 65% federal and 35% local cost-share requirement for design and construction. There is an assumption that in-kind services may be considered as part of these cost-share arrangements. The Commission's ability to fully commit to a cost-share arrangement is dependent upon preliminary designs, plans, and more definitive cost estimates.

This proposal is being advanced under the premise that sponsors would be responsible for removal of all hazardous, toxic, and radioactive wastes prior to any construction. Furthermore, the Commission understands that sponsors would be accountable for post-construction

responsibilities, including operation, maintenance, repair, rehabilitation, and eventual replacement of the project-related structure installed within Conneaut Creek.

The Commission is aware that this letter serves as expression of intent and is not a contractual obligation and that either party may discontinue the study process at any stage prior to construction.

Please note that Chris Freiburger is the Commission's point of contact for this project. Chris' email is cfreiburger@glfc.org and his telephone number is (734) 649-4518.

Sincerely,

Robert Lambe
Executive Secretary

cc: Pete Hrodey, Sea Lamprey Alternative Control and Evaluation Supervisor,
USFWS Matt Symbal, Alternative Control and Evaluation Unit, USFWS
Kevin Mann, Alternative Control and Evaluation Unit, USFWS
Michael Greer, Regional Technical Specialist
Michael Siefkes, Sea Lamprey Program Director, GLFC
John Dettmers, Fishery Management Program Director, GLFC
Jeff Tyson, Fishery Management Program Manager, GLFC

Great Lakes Fishery Commission
2200 Commonwealth Blvd, Suite 100
Ann Arbor, MI, 48105

734.662.3209
glfc.org